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Substantive issues for review in the areas of market entry, management of scarce resources and general end-user issues

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Substantive issues for review in the areas of market entry, management of scarce resources and general end-user issues

FINAL REPORT

A study prepared for the European Commission
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Abstract EN

This study examines the functioning of the Regulatory Framework for Electronic Communications (RFEC) in the three substantive domains of market entry and authorisation, the management of scarce resources (such as spectrum, numbers and land), and the protection of end-users since its enactment in 2002 to the present, and explores possible options for its development in view of current trends and emerging challenges.

The study identifies key provisions relative to each substantive domain and portrays their functioning in light of related implementation practices at Member State level and market developments. On the basis of qualitative as well as quantitative evidence, it sketches the Strengths, Weaknesses, Opportunities and Threats (SWOT) of the RFEC in each substantive domain, following the principles of the Commission's *Better Regulation Guidelines*. Taking account not only of current trends, but also of possible disruptive developments yet to occur, the study then goes on to elaborate a forward-looking analysis rooted in this retrospective assessment and delineates options for improving the future performance of the RFEC.

Résumé FR

Cette étude passe en revue le fonctionnement du Cadre Réglementaire pour les Communications Electroniques (CRCE) depuis sa promulgation jusqu'à aujourd'hui au sein des trois domaines essentiels que sont: l'apparition sur le marché de nouveaux arrivants et l'autorisation correspondante, la gestion des ressources rares (comme le spectre des fréquences, les numéros, l'accès à la terre (aux sites)), et la protection des utilisateurs finaux. Elle étudie les différentes possibilités concernant son évolution en prenant en compte les tendances actuelles et les défis qui se présentent.

L'étude identifie les dispositions majeures pour chaque domaine essentiel et décrit leur fonctionnement à la lumière des pratiques concernant leur mise en œuvre au niveau des Etats Membres et des évolutions du marché. A partir d'éléments de preuves quantitatifs et qualitatifs, elle esquisse les Forces, Faiblesses, Opportunités, et Menaces (SWOT) du CRCE pour chaque domaine essentiel, en conformité avec les principes des Lignes Directrices pour une Meilleure Régulation de la Commission. L'étude intègre non seulement les tendances actuelles, mais également les évolutions disruptives qui pourraient survenir dans le futur. L'étude développe alors une analyse prospective qui se fonde sur cette évaluation rétrospective, et définit des options permettant d'améliorer la performance future du CRCE.

Zusammenfassung DE

Diese Studie befasst sich mit der Funktionsweise des EU-Rechtsrahmens für elektronische Kommunikation (Regulatory Framework for Electronic Communication Services – RFEC) in den drei relevanten Bereichen Marktzutritt und -berechtigung, Verwaltung knapper Ressourcen (wie Spektrum, Nummern und Wegerechte) sowie dem Schutz von Endkunden seit seinem Inkrafttreten im Jahr 2002 bis zum heutigen Tage und untersucht Optionen für seine weitere Entwicklung im Licht aktueller Trends und zukünftiger Herausforderungen.

Die Studie identifiziert die wichtigsten Bestimmungen in Bezug auf die relevanten Bereiche und porträtiert ihr Funktionieren im Hinblick auf Implementierungspraktiken auf Ebene der Mitgliedsstaaten und Marktentwicklungen. Auf Basis sowohl qualitativer als auch quantitativer Analysen skizziert die Studie, im Einklang mit den Grundsätzen der „Better Regulation Guidelines“ der Kommission, die Stärken, Schwächen, Chancen und Risiken (SWOT – Strengths, Weaknesses, Opportunities und Threats) des RFEC für jeden relevanten Bereich. Unter Berücksichtigung nicht nur aktueller Trends, sondern auch möglicher störender zukünftiger Entwicklungen wird in der vorliegenden Studie eine zukunftsorientierte Analyse auf Basis einer retrospektiven Untersuchung ausgearbeitet und Möglichkeiten zur Verbesserung der zukünftigen Wirksamkeit des RFEC aufgezeigt.

Executive Summary

This study seeks to support the Commission's policy development towards the next review of the EU regulatory framework for electronic communications (RFEC)¹ as regards three *substantive domains*: (1) market entry, (2) the management of scarce resources such as spectrum, numbers and access to land, and (3) the protection of end-users, including 'must carry' rules and rules on electronic programme guides.

Within the scope of those substantive domains, the study is to provide (1) a thorough retrospective evaluation of the framework's functioning to date together with related implementation practices as well as market developments, and (2) a forward-looking analysis of ongoing and foreseeable developments in the marketplace and technology.

Our assessment of the framework in regard to the three substantive domains that are the subject of the present study is based on relevant provisions in the directives that comprise the RFEC. Numerous legislative instruments interact with the RFEC and influence how it is implemented in the Member States.

1 Methodology

Our assessment followed the following steps:

- (1) Collection of the data necessary to drive the analysis. Data was collected through (a) careful review of the RFEC, together with relevant EU documents and primary legislation at Member State level; (b) an extensive compilation of data based on a network of correspondents at Member State level; (c) an examination of the responses to the European Commission's (henceforth: the Commission) public consultation on the review of the RFEC corresponding to the subject matter domains dealt with; (d) in-depth interviews with commercial stakeholders, consumer advocates, regulatory bodies and other interested parties; and (e) a public workshop on interim results.
- (2) Identification of the framework for analysis, including relevant indicators and performance metrics, for each of the substantive domains.
- (3) Analysis of the functioning of the relevant provisions of the RFEC to date (see Section 2 of the report). This includes: (a) an analysis of the implementation of

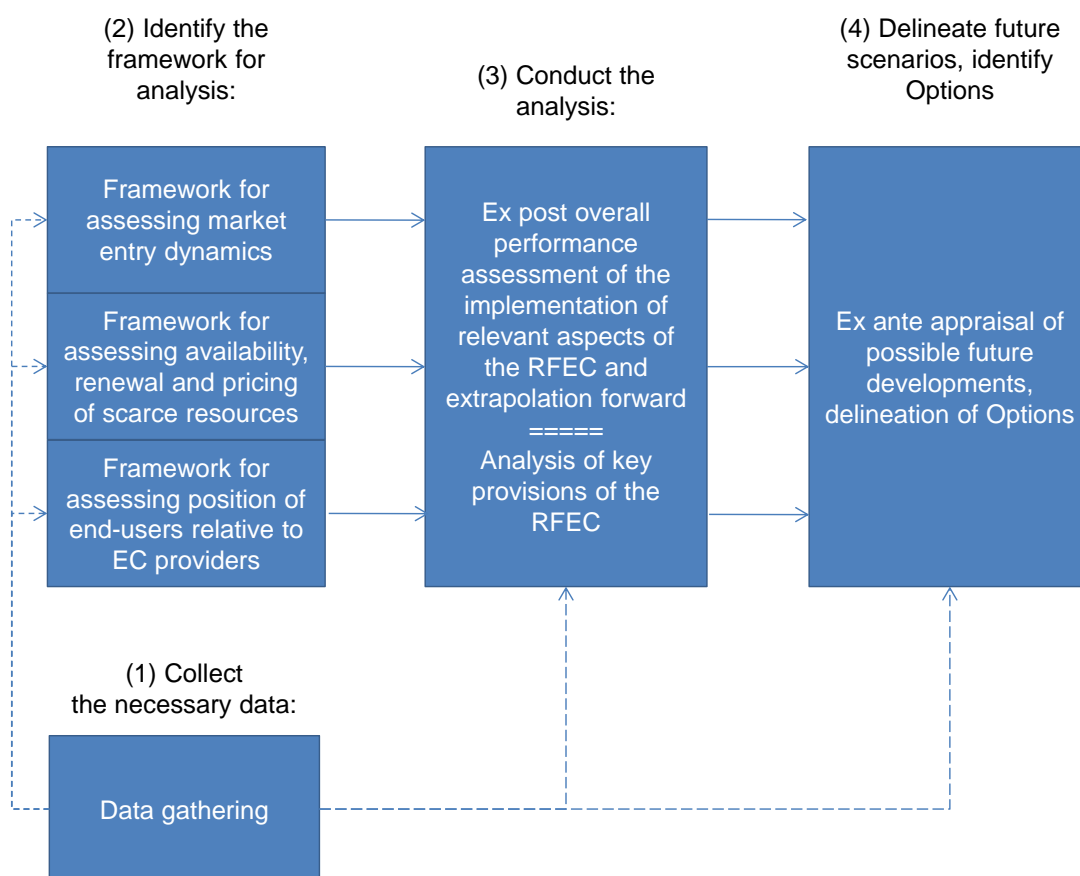
¹ The Regulatory Framework for Electronic Communications (RFEC) is identified in Recital 5 of Directive 2002/21/EC (the Framework Directive) as consisting of the Framework Directive itself and the four Specific Directives. Article 3(l) of the Framework Directive defines the Specific Directives as "Directive 2002/20/EC (Authorisation Directive), Directive 2002/19/EC (Access Directive), Directive 2002/22/EC (Universal Service Directive) and Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications)." The Directive on privacy and electronic communications has not been considered in this study.

key provisions; (b) an assessment of outcomes and their relation to implementation of the provisions, and identification of problem areas; and (c) an assessment of the performance of key provisions in terms of effectiveness, efficiency, coherence, relevance, and European added value, in line with the Commission's Better Regulation principles.² The analysis was backward-looking, assessing performance and identifying problems.

- (4) Based on this retrospective assessment, delineation of Options to improve the performance of the RFEC going forward (see Section 3 of the report). The analysis was forward-looking, assessing possible developments and identifying possible solutions.

The interrelation among these steps is illustrated in the following figure.

Sequence and structure of work in the project



² European Commission (2015), Better Regulation Guidelines, Commission Staff Working Document, SWD (2015) 111, 19.5.2015.
(http://ec.europa.eu/smart-regulation/guidelines/docs/swd_br_guidelines_en.pdf)

The study has elements of both an ex-post evaluation and an ex-ante impact assessment, and has been conducted in broad consonance with the Commission's *Better Regulation Guidelines*. A key bridge between the backward-looking evaluation and the forward-looking delineation of Options is a series of *SWOT analyses* (covering *Strengths*, *Weaknesses*, *Opportunities* and *Threats*, respectively) for each of the RFEC substantive domains that are covered by this study. The identification of Opportunities and Threats reflected not only predictable developments (as discussed in the next section of this Executive Summary), but also a range of more disruptive possible future developments.

The SWOT analysis then drove the definition of the Problem.

We then proceeded to delineate Options, each of which reflected a broad overall approach to addressing the Problem by mitigating the Weaknesses and Threats, while drawing on the Strengths and realising the Opportunities.

In this study, in light of the presence of multiple substantive domains with complex interrelationships, we have chosen to provide a more granular approach to the Options than is customary by developing candidate *Action Lines*. Each of these seeks to address one or more aspects of the Problem (and thus to mitigate one or more Weaknesses or Threats). These candidate Action Lines were then grouped together into Options, bearing in mind that some appear in more than one Option.

The Action Lines were crafted in view of the most likely scenarios for market and technological evolution. For each substantive domain, we also discussed possible responses to more disruptive but less likely scenarios such as faster-than-expected shifts from fixed to mobile networks (see Section 3.2.2 of the report), or gains in the effectiveness of dynamic spectrum management (see Section 3.2.3 of the report).

2 An assessment of the RFEC as enacted and as implemented in the Member States

The analysis shows the RFEC to be functioning reasonably well in regard to the three substantive domains that we have been called on to study; nonetheless, there is room for improvement.

A number of over-arching themes are visible. In all three substantive domains, the Framework provides for a degree of harmonisation, but not for uniformity. The RFEC establishes broadly consistent rules across the Member States, but does not ensure identical outcomes.

The need to promote connectivity at high and very high speeds is widely recognised today, but was less visible when the RFEC was last amended in 2009, and was not explicitly recognised as a regulatory objective. We have taken this need into account in

the Options that we delineate, while noting that the link with the substantive domain of access regulation has been addressed in a separate study undertaken on behalf of the Commission.³

Rapid improvements in technology, including the availability of fixed and mobile broadband at progressively higher speeds,⁴ generate benefits for European consumers and firms, and mitigate numerous current policy concerns, but also create new ones. Improved technology (1) has increased the demand for high speed mobile broadband, thus also putting demands on spectrum management; (2) has enabled fibre-based broadband, thus also putting demands on access to land (since new fibre needed to be deployed to replace existing copper); (3) has made it possible for largely unregulated *Over-the-Top (OTT)* services that compete with regulated *electronic communications services (ECS)* to enter the market, raising concerns about possible competitive and regulatory asymmetries; (4) has enabled Machine-to-Machine communications and the Internet of Things (IoT), thus putting pressure on existing numbering arrangements; and (5) has enabled existing cable and satellite infrastructure to carry more channels, thus mitigating some of the concerns over scarcity and over competitive issues that had contributed to the need for ‘must carry’ rules, but at the same time creating demand for higher bandwidth channels by potentially a greater number of users with the risk that scarcity might possibly re-emerge.

2.1 Market entry

Established market players report that the authorisation regime is not a problem for them; moreover, administrative burdens appear to be low (see Section 2.1.6.1 of the report). For smaller firms seeking entry, however, detailed procedures that vary greatly among the Member States (together with widely varying administrative charges for authorisation) may possibly present a barrier to entry.

Access to scarce resources, especially access to suitable spectrum for network operators that require it, can pose far greater challenges to market entry than does the notification and authorisation regime itself.

³ Ilsa Godlovitch, Wolter Lemstra, Christoph Pennings, Karl-Heinz Neumann, Alexandre de Streel et al., “Regulatory, in particular access, regimes for network investment models in Europe”, September 2016, http://bookshop.europa.eu/en/regulatory-in-particular-access-regimes-for-network-investment-models-in-europe-pbKK0216677/downloads/KK-02-16-677-EN-N/KK0216677ENN_002.pdf?FileName=KK0216677ENN_002.pdf&SKU=KK0216677ENN_PDF&CatalogueNumber=KK-02-16-677-EN-N

⁴ See Ilsa Godlovitch et al., “Regulatory, in particular access, regimes for network investment models in Europe”, September 2016, op. cit.

2.2 Scarce resources

We have been called on to study three thematic areas within the substantive domain of scarce resources: (1) spectrum management, (2) access to numbers, and (3) access to land. A common concern across these three thematic areas is that defects in the assignment of the scarce resource can slow or hinder market entry or network deployment.

A second commonality is that in each of these thematic areas, arrangements vary substantially among the Member States; however, the impacts of that fragmentation also vary among them.

Finally, we note that all three thematic areas affect and are affected by technological evolution, notably including (1) the growing deployment and adoption of high speed broadband; (2) the emergence of OTT services; and (3) the emergence of Machine-to-Machine (M2M) communications and the Internet of Things (IoT).

2.2.1 Spectrum management

There are many strengths in European spectrum management practices, but also some pronounced weaknesses (see Sections 2.2.5 and 2.2.6 of the report):

- Delays in assignment of 800 MHz and 2.6 GHz spectrum caused a clear loss of macroeconomic efficiency.
- Our evidence base has identified isolated instances of apparently poor practice in spectrum assignment in the Wireless Access Policy for Electronic Communications Services (WAPECS) bands that are used for ECS, including setting reserve prices too high in order to fill budget gaps in the Member State in question, or auction designs that had obvious defects.
- The RFEC does not provide a clear boundary between the roles of politics versus that of regulation in spectrum management.
- Overall, there is no meaningful review of Member State practices by any independent party.

2.2.2 Access to numbers

Existing arrangements deal well with the issues that were of interest in the past, but fundamental changes in the nature of the use of numbers are introducing new, but not entirely predictable strains on existing arrangements. Voice over IP (VoIP), Machine-to-Machine (M2M) communications, and the Internet of Things (IoT) raise challenges to traditional arrangements, and may in particular require the ability to use telephone numbers outside of the country that issued them (i.e. extra-territorial use) on an indefinite basis (see Section 2.3.1 of the report).

The European Telephony Numbering Space (ETNS) is now inoperative; however, there continues to be interest in establishing a European identity in terms of numbers.

2.2.3 Access to land

The migration to fibre-based fast broadband and mobile broadband is putting stress on existing arrangements. There is an urgent need to find good solutions, particularly in light of the widely recognised need to promote high speed connectivity going forward.

Because granting rights for access to land and rights of way is highly decentralised, procedures are extremely diverse, and harmonisation at EU level extremely challenging.

The time to obtain access to land and building permits needed for network deployment is substantial and not fully predictable. In regard to the rules implemented among the Member States as regards access to rights of way, there is substantial variability in (1) the time period between application and granting of rights of way; (2) the duration for which rights of way are granted; and (3) the fees and charges associated with rights of way (see Section 2.4.3 of the report).

Additionally, rules regarding Electromagnetic Fields (EMF) in some Member States or municipalities are far more stringent than EU recommendations (see Section 2.4.4 of the report). This poses challenges for construction of wireless infrastructure.

2.3 End-user rights

The substantive domain of end-user rights entails both provisions of a contractual nature and other provisions serving end-user interests by enabling measures on issues such as service quality, content carriage ('must carry') and access conditions (Electronic Programme Guide).

2.3.1 End-user protection

We have found a relatively high level of consumer satisfaction with regard to the existing contract information and ease of comparability in surveys, and also a relevant amount of switching in the past. This suggests that many of the end-user protection provisions of the RFEC have worked well.

Fragmentation poses a challenge, both (1) among the Member States due to minimal harmonisation, and (2) between sector-specific end-user protection measures versus horizontal consumer protection measures.

Our assessment of sector-specific and horizontal consumer protection measures has led us to conclude, however, that the overlap between them is not a serious concern (see Section 2.5.5 of the report). Moreover, sector-specific end-user protection rules

have distinct value to the extent that they (1) address needs such as quality of service and number portability that are specific to the sector and benefit from the competence of sector regulators, and (2) protect end-users, which include small and medium business customers, while horizontal measures are limited to the protection of consumers.

A number of specific issues need attention (see Section 2.5.7.1.1 of the report). The growing relevance of OTT services raises numerous questions as to which end-user obligations should be applicable to which services. The treatment of bundled services is not always clear with regard to contract duration and termination, for example when a component of a bundle is cancelled. Furthermore, rules on early termination have not been universally imposed and would merit further precision.

2.3.2 'Must carry' and Electronic Programme Guide (EPG) rules

'Must carry' rules exist to address two distinct needs: (1) protection of providers of content that consumers value from possible anti-competitive acts on the part of transmission platforms; and (2) protection of media pluralism and freedom of expression.

Over the past decade, technological improvements have largely eliminated scarcity on most broadcast media, which has had the effect of mitigating concerns over possible anti-competitive acts. This is a profound change in the landscape, but it does not necessarily mean that the need for 'must carry' has gone away (see Sections 2.6.4 and 2.6.6.1 of the report).

EPG rules enable Member States to impose obligations on operators regarding application program interfaces, EPG and similar listing and navigation facilities with regard to the presentational aspect; however, only a minority of Member States have imposed such obligations. Findability of radio and television channels might however become an issue as technology evolves (see Section 2.6.1.2.3 of the report).

3 Options going forward

The Options that we have identified, from smallest to greatest intervention, are:

- **Baseline scenario:** In keeping with the Commission's Better Regulation Guidelines, the baseline scenario provides a projected development against which all other Options are measured. By definition, this is the Option where no new policy initiatives are undertaken.
- **Modest, incremental improvements:** A second Option groups together Action Lines that go beyond current practice, but without necessitating a substantial, potentially disruptive overhaul of any existing arrangements.

- **Intensive improvements:** A third Option groups together Action Lines that promise greater improvement than in the second Option, even at some risk of disruption.
- **Elimination of certain provisions to promote simplification:** A fourth Option places primary emphasis on elimination of certain existing elements of the RFEC, even at some risk that certain existing protections might be sacrificed. The goal is regulatory simplification, consistent with the Better Regulation principles put forward by the Commission. Elimination of regulations, where feasible, may reduce the risk of asymmetries between traditional services and newer, internet-based services. The essential elements of this Option include (1) elimination of sector-specific rules in support of the rights of end-users (placing reliance instead on horizontal instruments such as the Consumer Rights Directive); and (2) a phasing out of ‘must carry’ regulation.
- **Centralisation to achieve consistency:** A fifth Option puts primary emphasis on centralisation of authority, seeking to achieve maximum regulatory consistency across the Member States, but at some risk to the principle of subsidiarity. Consistency in areas where we have not proposed full centralisation might be provided by means of either tighter specification in regulations rather than directives, or by means of harmonising decisions or recommendations. This can be viewed as the most radical of the Options put forward.

In our view, a judicious selection of Action Lines from the “intensive improvements” Option is likely to produce better results than remaining with the baseline scenario, and also better results than any of the other Options. The measures put forward are likely to be effective and efficient, and they are consistent with the principles of proportionality and subsidiarity. Their superiority appears to hold both under the most likely and the various disruptive scenarios of future evolution that we consider. Other Options promise more radical benefits on individual Action Lines, which may enjoy considerable support among certain stakeholders, but compare less favourably on balance in terms of effectiveness, proportionality and/or subsidiarity.

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Abbreviations

2G	2 nd Generation Wireless Technology Standard (includes GSM)
3DTV	3D Television
3G	3 rd Generation Wireless Technology Standard (includes UMTS)
3GPP	3 rd Generation Partnership Project
4G	4 th Generation Wireless Technology Standard (includes LTE)
5G	5 th Generation Wireless Technology Standard
A1TA	A1 Telecom Austria (a network operator)
ACM	Autoriteit Consument & Markt (Dutch NRA)
AD	Access Directive (Directive 2002/19/EC)
ADR	Alternative Dispute Resolution
ADRD	Alternative Dispute Resolution Directive (Directive 2013/11/EU)
ADSL	Asymmetric Digital Subscriber Line
AGCM	Autorità Garante della Concorrenza e del Mercato
AGCOM	Autorità per le Garanzie nelle Comunicazioni (Italian NRA)
AIP	Administrative Incentive Pricing
AKOS	Agency for Communication Networks and Services of the Republic of Slovenia (Slovenian NRA)
ANACOM	Autoridade Nacional de Comunicações (Portuguese NRA)
API	Application Program Interface
ARCEP	Autorité de régulation des communications électroniques et des postes (French NRA)
ARN	Allmänna Reklamnämnden (Swedish consumer dispute organisation)
AT	Austria
AuD	Authorisation Directive (Directive 2002/20/EC)
AVG	Average
AVMSD	Audiovisual Media Services Directive (Directive 2010/13/EU)
B2B	Business-to-Business
B2C	Business-to-Consumer
BB	Broadband
BBC	British Broadcasting Corporation
BE	Belgium
BEREC	Body of European Regulators of Electronic Communications
BG	Bulgaria
BIPT	Belgisch Instituut voor postdiensten en telecommunicatie (Belgian NRA)
BMWi	Bundesministerium für Wirtschaft und Energie (German Ministry of Economic Affairs and Energy)
BNetzA	Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen (German NRA)

BRF1/BRF2	Belgisches Rundfunk- und Fernsehzentrum der Deutschsprachigen Gemeinschaft (Radio Station for the German Community of Belgium)
BT	British Telecom
bus	business end users
BWA	Broadband Wireless Access
CAGR	Compound Average Growth Rate
CAPEX	Capital Expenditure
CCA	Combinatorial Clock Auction
CCDP	Co-channel dual-polarisation
CDMA	Code Division Multiple Access
CDN	Content Delivery Network
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CEPT	European Conference of Postal and Telecommunication Administrations
CH	Switzerland
CISAS	Communications and Internet Services Adjudication Scheme (Ofcom approved dispute resolution scheme for consumers in the UK)
CNMC	Comisión Nacional de los Mercados y la Competencia (Spanish NRA)
COCOM	Communications Committee
COM	European Commission
ComReg	Commission for Communications Regulation (Irish NRA)
CP	Communication Provider
CPC	Consumer Protection Cooperation
CPCE	Code des Postes et des Communications Electroniques (Code of post and electronic communications)
CRC	Communications Regulation Commission (Bulgarian NRA)
CRCE	Cadre Réglementaire pour des Communications Electroniques
CRD	Consumer Rights Directive (Directive 2011/83/EU)
CRIDS	Centre de Recherche Information, Droit et Société (Research Centre in Information, Law and Society)
CSA	Conseil Supérieur de l'Audiovisuel (High Council for the Audiovisual Media for the French community in Belgium)
CTU	Czech Telecommunication Office (Czech NRA)
CUT	Coordinated Universal Time
CV	coefficient of variation
CY	Cyprus
CZ	Czech Republic
CZK	Czech Krone
DAB	Digital Audio Broadcasting
DAE	Digital Agenda for Europe

DE	Germany
DEI	Dimosia Epicheirisi Ilektrismou
DIR	Directive
DK	Denmark
DKK	Danish Kroner
DO	Donor operator
DOCSIS	Data Over Cable Service Interface Specification
DSLAM	Digital Subscriber Line Access Multiplexer
DSL	Digital Subscriber Line
DSM	Digital Single Market
DSP	Digital Signal Processing
DT	Deutsche Telekom
DTT	Digital Terrestrial Transmission
DTV	Definition Television
DVB-H	Digital Video Broadcasting – Handhelds
DVB-S2	Digital Video Broadcasting – Satellite – Second Generation
DVB-T2	Digital Video Broadcasting – Terrestrial, 2nd generation
E.164	The international public telecommunication numbering plan
E.212	The international identification plan for public networks and
EC	Electronic Communications
ECA	Estonian Competition Authority
eCall	Emergency Call
ECC	Electronic Communications Committee
ECN	Electronic Communication Network
ECO	European Communications Office
ECPB	Estonian Consumer Protection Board
ECS	Electronic Communications Service(s)
ECTA	European Competitive Telecommunications Association
EDF	Électricité de France
EDGE	Enhanced Data Rates for GSM Evolution
EE	Estonia
EEA	European Economic Area
EEC	European Economic Community
EETT	Hellenic Telecommunications and Post Commission (Greek NRA)
EFIS	ECO Frequency Information System
EIRCOM	Irish telecommunication company
EMF	Electromagnetic fields
EN	English
ENRA	Estonian National Road Administration
EPC	Evolved Packet Core
EPG	Electronic Programme Guide

ERGA	European Regulators Group for Audiovisual Media Services
ERO	European Radiocommunications Office
ES	Estonia
eSIM	Embedded Subscriber Identity Module
ESIM	Earth Station in Motion
ESO	European Standards Organisation
ESOA	EMEA Satellite Operators Association
ETNS	European Telephony Numbering Space
ETRA	Republic of Estonia Technical Regulatory Authority (Estonian NRA)
ETSI	European Telecommunications Standards Institute
EU	European Union
eUICC	embedded Universal Integrated Circuit Card
FI	Finland
FICORA	Finnish Communications Regulatory Authority (Finnish NRA)
FR	France
FRND	Fair, Reasonable and Non-Discriminatory
FTTB	Fibre to the Building
FTTC	Fibre to the Curb
FTTH	Fibre to the Home
FTTS	Fibre to the Street
FULs	Fair Use Limits
FWD	Framework Directive (Directive 2002/21/EC)
GADSS	Global Aeronautical Distress and Safety Systems
Gbit/s	Gigabit per second
GDP	Gross Domestic product
GHz	Gigahertz
GMDSS	Global Maritime Distress and Safety Systems
GPON	Gigabit Passive Optical Network
GPRS	General Packet Radio Service
GR	Greece
GSM	Global System Mobile
GSMA	Global System for Mobile Communications Association
GSM-R	GSM-Rail
H3G	Hutchinson 3G
HAKOM	Hrvatska regulatorna agencija za mrežne djelatnosti (Croatian NRA)
HD and 3D	High definition and 3D
HDTV	High Definition Television
HEVC	High Efficiency Video Coding
HH	Household
HHI	Herfindahl- Hirschman Index

HLR	Home Location Register
HR	Croatia
HSPA	High Speed Packet Access
HU	Hungary
HUF	Hungarian Forint
IANA	Internet Assigned Numbers Authority
ICE	Intercity Express
IE	Ireland
ILR	Institut Luxembourgeois de Régulation
IMCO	Internal Market and Consumer Protection
IMSI	International Mobile Subscriber Identity
IMT	International Mobile Communications
IoT	Internet of Things
IP	Internet Protocol
IPG	Interactive Programme Guide
IPTV	Internet Protocol Television
IPv4	Internet Protocol version 4IPv6 Internet Protocol version 6
IS	Iceland
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Italy
ITS	Intelligent Transport Systems
ITU	International Telecommunication Union
ITU-R	ITU-Radiocommunications Sector
ITV	Independent Television
JIPITEC	Journal of Intellectual Property, Information Technology and Electronic Commerce Law
kbps	Kilobits per second
KPN	Koninklijke PTT Nederland
LPWA	Low Power Wide Area (technology to support the Internet of Things (IoT))
LSA	Licence Shared Access
LT	Lithuania
LTE	Long Term Evolution
LU	Luxembourg
LV	Latvia
M2M	Machine-to-Machine
Mbit/s	Megabits per second
MCA	Malta Communications Authority (Maltese NRA)
MCC	Mobile Country Code
MCCAA	Malta Competition and Consumer Affairs Authority
MDF	Main Distribution Frame

MDU	Multi Dwelling Units
MHz	Megahertz
MMDS	Multichannel Multipoint Distribution Service
MMS	Multimedia Messaging Service
MNC	Mobile Network Code
MNO	Mobile Network Operator
MPEG	Moving Picture Experts Group
MRF	Mecanizados Rodríguez Fernández (a firm in Spain)
ms	milliseconds
MS	Member States
MSS	Mobile Satellite Services
MPEG	Moving Picture Experts Group
MT	Malta
MUX	Multiplex
MVNO	Mobile Virtual Network Operator
NA	Not applicable
NANP	North American Numbering Plan
NATO	North Atlantic Treaty Organization
NCMC	National Commission on Markets and Competition (Spanish NRA, also competition authority and regulator for various other sectors)
NetMetr	name of a tool for measuring the quality of Internet access services
NFH	Nemzeti Fogyasztóvédelmi Hatóság (Hungarian NRA)
NFV	Network Funktion Virtualisation
NGA	Next Generation Access
NGN	Next Generation Network
NL	Netherlands
NLoS	Non-light of sight
NMA	Nationale Mededingings Autoriteit (Dutch Competition Authority)
NMHH	Nemzeti Média- és Hírközlési Hatóság (Hungarian NRA)
NO	Norway
NP	Number Portability
NRA	National Regulatory Authority
OCECPR	Office of the Commissioner of Electronic Communications and Postal Regulation (Cypriot NRA)
ODR	Online Dispute Resolution
OECD	Organisation for Economic Co-operation and Development
OFCOM	Office of Communications (UK NRA)
ONP	Open Network Provision
OSCE	Organization for Security and Co-operation in Europe
OTA	Over the Air

OTT	Over-the-top
P2P	Peer-to-Peer
PAMR	Public Access Mobile Radio
PC	Personal Computer
PMR	Private Mobile Radio
PMSE	Programm Making and Special Events
pop	population
PP	Point-to-Point
PPDR	Public Protection and Disaster Relief
PL	Poland
PLN	Polish złoty (currency)
PRS	Premium Rate Service
PSB	Public Service Broadcasting
PT	Portugal
PTS	Post- och telestyrelsen (Swedish NRA)
QoS	Quality of Service
RAN	Radio Access Network
REFIT	Regulatory Fitness and Performance Programme
res	residential end users
RFEC	Regulatory Framework for Electronic Communications
RIAS	Rundfunk im amerikanischen Sektor (Broadcasting Service in the American Sector)
RIO	Reference Interconnection Offer
RIR	Regional Internet Registries
RLAH	Roam Like at Home
R-LAN	Radio Local Area Network
RO	Romania
RO	Receiving Operator
RRT	Communications Regulatory Authority (Latvian NRA)
RSC	Radio Spectrum Committee
RSPG	Radio Spectrum Policy Group
RSPP	Radio Spectrum Policy Programme
RTE	Raidió Teilifís Éireann
RTR	Rundfunk & Telekom Regulierungs GmbH (Austrian NRA)
SD	Directive on Services (Directive 2006/123/EC)
SDN	Software Defined Radio
SDTV	Standard-Definition Television
SE	Sweden
SEK	Swedish Krona
SES	Société Européenne des Satellites (a European satellite communications firm)

SETSI	Secretaria de Estado de Telecomunicaciones y para la Sociedad de la Informacion (Ministerial department for Telecommunications (Spain))
SFN	Single Frequency Networks
SG	Strategy Group
SIM	Subscriber Identity Module
SI	Slovenia
SK	Slovakia
SMA	Spectrum Management Agency
SMEs	Small and Mediumsized Enterprises
SMP	Significant Market Power
SMRA	Simultaneous Multiple Round Auction
SMS	Short Message Service
SP	Service Provider
SPRK	Sebiedrisko Pakalpojumu Regulesana Komisija (Public Utilities Commission in Latvia)
SRD	Short Range Devices
SVOD	Subscription Video on Demand
SWD	Staff Working Document
SWOT	Strenghts, Weaknesses, Opportunities and Threats
T&C	Terms and Conditions
TEC	Treaty on European Communities
TETRA	Terrestrial Trunked Radio
TEU	Treaty on European Union
TDD	Time-Division Duplexing
TF1	Télévision Française 1
TFEU	Treaty on the Functioning of the European Union
TKK	Telekom-Control-Kommission
TNABF	Tabelul National de Atribuire a Benzilor de Frecvente Radio (table of Romanian awards of frequencybands)
TPS	technical platform services
TSB	Telecommunication Standardization Bureau of the International Telecommunications Union ITU-T Sector (ITU-T)
TV	Television
UCPD	Unfair Commercial Practices Directive (Directive 2005/29/EC)
UCTD	Unfair Contract Terms Directive (Directive 93/13/EEC)
UHDTV	Ultra High Definition Television
UHF	Ultra High Frequency
UKE	Urząd Komunikacji Elektronicznej (Polish NRA)
UMTS	Universal Mobile Telecommunications System
UK	United Kingdom
U.S.	United States of America
USD	Universal Service Directive (Directive 2002/22/EC)

USO	Universal Service Obligation
VAT	Value Added Tax
VDSL	Very High Speed Digital Subscriber Line
VHF	Very High Frequency
VKI	Verein für Konsumenteninformation (Austrian consumer protection organisation)
VOD	Video on Demand
VoIP	Voice over Internet Protocol
WAPECS	Wireless Access Policy for Electronic Communications Services
WCDMA	Wideband Code Division Multiple Access
WAS/RLAN	Wireless Access Systems/Local Radio Networks
WD	Working Days
Wi-Fi	Wireless fidelity
WIK	Wissenschaftliches Institut für Infrastruktur und Kommunikationsdienste
WLAN	Wireless Local Area Network
WLL	Wireless local loop
WRC	World Radio Conference
xDSL	Any form of Digital Subscriber Line (including ADSL and VDSL)
XPIC	Cross-polarisation interference cancellation
YLE	Yleisradio Finland
ZEKom	Zakon o elektronskih komunikacijah (Slovenian Electronic Communications Act)

1 Introduction

This is the Final Report for the project “Substantive issues for review in the areas of market entry, management of scarce resources and general end-user issues”, SMART 2015/0003, conducted on behalf of DG CONNECT, European Commission.

Section 1.1 of this introductory chapter notes the goals of the study; Section 1.2 describes our methodology; and Section 1.3 identifies the key EU regulatory framework for electronic communications (RFEC)⁵ provisions and related legal instruments that are relevant to this study. Section 1.4 discusses the geographic scope of the study, while Section 1.5 considers the over-arching question of the handling of Over-the-Top (OTT) services. Finally, Section 1.6 explains the structure of the rest of the report.

1.1 Goals

The study is intended to support the Commission's policy development towards the preparation of the next review of the RFEC as regards three *substantive domains* (see Figure 1):

- market entry,
- the management of scarce resources, which is comprised of three *thematic areas*: spectrum management, numbers and access to land, and
- end-user protection, which entails both provisions of a contractual nature, and other provisions serving end-user interests by enabling measures on service quality, content carriage ('must carry'), and access conditions (Electronic Programme Guide).

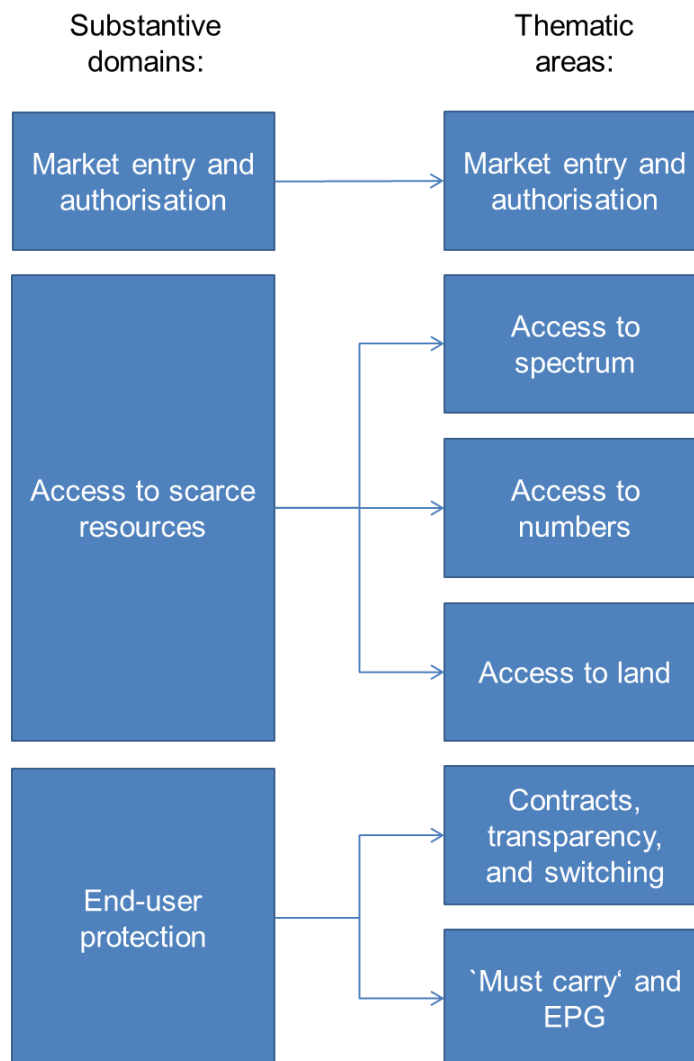
These three substantive domains thus correspond to six thematic areas:

- market entry,
- access to spectrum,
- access to numbers,

⁵ The Regulatory Framework for Electronic Communications (RFEC) is identified in Recital 5 of Directive 2002/21/EC (the Framework Directive) as consisting of the Framework Directive itself and the four Specific Directives. Article 2(l) of the Framework Directive defines the Specific Directives as “Directive 2002/20/EC (Authorisation Directive), Directive 2002/19/EC (Access Directive), Directive 2002/22/EC (Universal Service Directive) and Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications).” The Directive on privacy and electronic communications has not been considered in this study.

- access to land,
- end-user protection, and
- 'must carry' and Electronic Program Guide (EPG) rules.

Figure 1: Substantive domains and thematic areas



Source WIK-Consult

Within the scope of those substantive domains/thematic areas, this study is to provide (1) a thorough retrospective evaluation of the framework's functioning to date together with related implementation practices as well as market developments, and (2) a forward-looking analysis of ongoing and foreseeable developments in the marketplace and technology.

1.2 Methodology

Our assessment of the framework in regard to the substantive domains/thematic areas is based on relevant provisions in the directives that comprise the RFEC.⁶ Numerous legislative instruments interact with the core RFEC and influence how it is implemented in the Member States. A comprehensive list appears in Section 1.3.

1.2.1 Steps

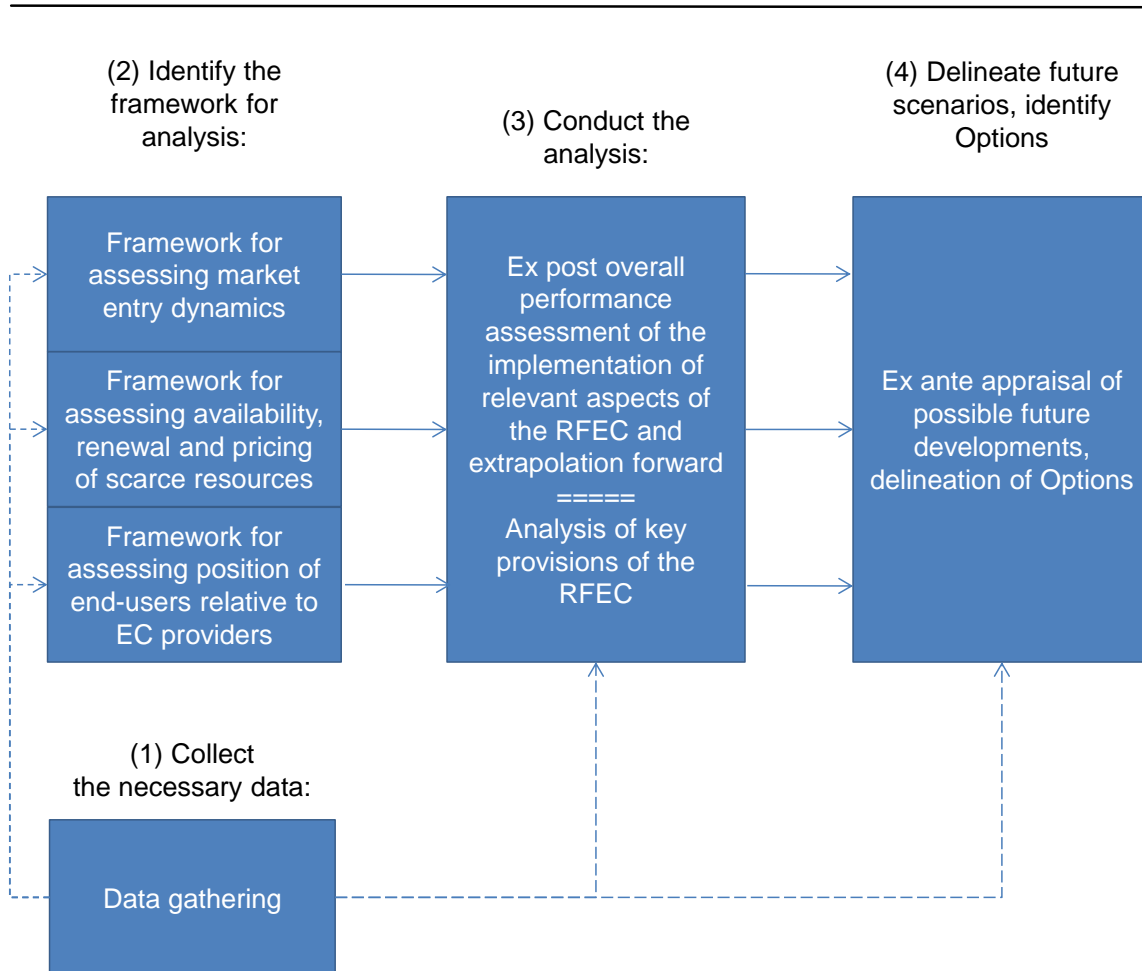
Our methodological approach comprises the following four steps, as depicted in Figure 2 and as discussed at greater length in the remainder of this section.

- Collection of the data necessary to drive the analysis. This a complex, horizontal task that gathers the data required for all subsequent analysis.
- Identification of the framework for analysis, including relevant indicators and performance metrics, for each of the substantive domains/thematic areas.
- Analysis of the functioning of the relevant provisions of the RFEC to date. This includes: (a) an analysis of the implementation of key provisions; (b) an assessment of outcomes and their relation to implementation of the provisions, and identification of problem areas; and (c) an assessment of the performance of key provisions in terms of effectiveness, efficiency, coherence, relevance, and European added value, in line with the Commission's Better Regulation principles. This analysis is backward-looking, assessing performance and identifying problems.

⁶ The Regulatory Framework for Electronic Communications (RFEC) is identified in Recital 5 of Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive), [2002] OJ L108/33, <http://data.europa.eu/eli/dir/2002/21/oj> (consolidated version: <http://data.europa.eu/eli/dir/2002/21/2009-12-19>) as consisting of the Framework Directive itself and the four Specific Directives. Article 2 point (l) of the Framework Directive goes on to define the Specific Directives. These are Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive), [2002] OJ L108/21, <http://data.europa.eu/eli/dir/2002/20/oj> (consolidated version: <http://data.europa.eu/eli/dir/2002/20/2009-12-19>); Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive), [2002] OJ L108/7 (<http://data.europa.eu/eli/dir/2002/19/oj> (consolidated version: <http://data.europa.eu/eli/dir/2002/19/2009-12-19>); Directive 2002/22/EC of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive), [2002] O. 2002 L108/51, <http://data.europa.eu/eli/dir/2002/22/oj> (consolidated version: <http://data.europa.eu/eli/dir/2002/22/2016-04-30>); and Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector (Directive on privacy and electronic communications), [2002] OJ L201/37, <http://data.europa.eu/eli/dir/2002/58/oj> (consolidated version: <http://data.europa.eu/eli/dir/2002/58/2009-12-19>). The last of these is part of the RFEC, but has not been considered in this study. Amendments to these directives are reflected in the consolidated versions.

- Based on the retrospective assessment, delineation of Options to improve the performance of the RFEC going forward. This analysis is forward-looking, assessing possible developments and identifying possible solutions.

Figure 2: Sequence of steps in the project



Source: WIK Consult

1.2.2 Gathering the data

In order to develop a suitable framework for analysis and to assess the performance of the RFEC in the relevant substantive domains, it was necessary to collect extensive and wide-ranging qualitative and quantitative data. Our data gathering activities have consisted of:

- Careful review of the RFEC itself (see Section 1.3), together with relevant related documents at European level to the extent necessary, and primary legislative documents at Member State level.

- A compilation of data based on Cullen International's network of correspondents covering all EU Member States.
- An examination of the responses to the Commission's public consultation that are relevant to market entry authorisation, scarce resources and end-user issues.⁷
- In-depth interviews (either face to face or by telephone) to capture the perspectives of commercial stakeholders, consumer advocates, regulatory bodies and other interested parties.
- A public workshop that not only enabled us to validate and correct conclusions to date, but also provided stakeholder input to help fill data gaps.

The data gathering activities were targeted at enabling us to perform the *ex post* assessment of the RFEC's implementation for the three substantive domains. We identified indicators and performance metrics relevant to:

- input factors, notably related to the implementation of the framework, and other factors;
- intermediate outcomes such as competition and investment; and
- consumer outcomes such as availability of services, prices and quality, or the fulfilment of end-user rights.

Input factors, together with intermediate and consumer outcomes, enabled us to identify the Member States that fare best in terms of consumer outcomes (best practice), and to identify deficiencies.

We then systematically captured the data, benefitting from Cullen International's network of correspondents who routinely gather data about the regulation of electronic communications and related matters in all 28 Member States. Given the great breadth of data required, it was necessary to focus these data collection efforts on Member States for which data was reasonably available, and on years for which the necessary data were meaningful and available. We drew on existing research where available, and on publicly available statistical sources including Commission sources such as the DAE scoreboard and Eurobarometer survey data.

Interviews enabled us to deepen our understanding, to fill gaps in our evidence base, and also to validate any tentative findings. The list of interviewees and the questionnaire used to structure the interviews appears as an Appendix in Section 5.2.

⁷ For the Commission's synopsis report, see European Commission (2016), Synopsis Report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, 20.4.2016. (<https://ec.europa.eu/digital-single-market/en/news/full-synopsis-report-public-consultation-evaluation-and-review-regulatory-framework-electronic>).

1.2.3 Developing the framework for analysis and assessment of developments

For each of the three substantive domains covered by this study, we developed a framework for conducting the analysis. The details differed among the three substantive domains, but in each case the analysis addressed the following issues:

- Analysis of relevant technological and commercial trends.
- Assessment of the implementation and performance of framework, consisting of:
 - Comparison of regulatory rules across the Member States; and
 - Assessment of how implementation / application of rules impacts on outcomes, including identification of best practice and deficiencies.
 - Assessment of the institutional functioning and possible shortcomings.

It was necessary to customise this approach somewhat in light of differences among the substantive domains. Notably, for substantive domains such as end-user protection, it was practical to assess the effects of individual RFEC provisions; for other areas such as spectrum management, however, the interaction among multiple RFEC provisions is complex, and the outcomes are best understood as reflecting the performance of the system as a whole. This second situation is somewhat analogous to trying to understand the performance of an automobile in terms of gasoline mileage – the performance of the spark plugs or the carburettor are important, but there is no single component that uniquely determines the vehicle's overall mileage.

1.2.4 Assessing ex post the performance of the RFEC

Consistent with the Commission's 2015 *Better Regulation Guidelines*, we assessed:

- the degree to which the aspects of the RFEC that address the substantive domains/thematic areas at issue (as implemented by the Member States) have been *effective* and *efficient* to date in achieving their objectives (as expressed in Article 8 of the Framework Directive⁸);
- the degree to which the relevant portions of the RFEC have shown themselves to be *relevant* to the goals sought by the RFEC, and
- *coherent* with other European policies and other RFEC provisions; and
- the degree to which they provide *EU added value* (in comparison with measures that the Member States might instead have implemented individually).

⁸ Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive), [2002] OJ L108/33.

Again, for each substantive domain/thematic area, the relevant objectives in Article 8 of the Framework Directive constitute our starting point. The overall criteria that we used for this assessment appear in Table 1.

Table 1: Criteria for ex post assessment of key framework provisions

Criterion	Issues
Effectiveness	<p>Did the rules regarding market entry, access to scarce resources and end-user rights address the problem identified and contribute to achieving the framework objectives?</p> <ul style="list-style-type: none"> Developing the internal market (Have the current provisions led to common rules in all Member States or are these topics still regulated differently in the various Member States?) Promoting competition Promoting the interests of EU citizens <p>If shortcomings are visible, are they due to national institutional arrangements/hierarchy of nationally pursued objectives and/or a result of ambiguous drafting of EU provisions concerned?</p> <p>We additionally deal, where relevant, with the impact of the framework provisions on promoting investment.</p>
Efficiency	<p>Were the costs involved reasonable?</p> <p>Could the same outcome have been achieved through other instruments, such as recommendations, self or co-regulation mechanisms, or less intrusive measures that would be susceptible to fulfil their objectives, or under different institutional arrangements?</p>
Coherence	<p>Does the policy complement other actions or are there contradictions?</p> <ul style="list-style-type: none"> Internal coherence between framework provisions: Do the provisions regarding (i) authorisation, (ii) management of scarce resources (such as numbering, spectrum access, and access to land), and (iii) end-users protection complement other framework elements or are there contradictions? Coherence with other EU policies: Do the framework provisions complement other EU policies or are there contradictions. Other EU policies include (i) Competition policy and state aid, (ii) Data protection and privacy, (iii) Audiovisual policy, (iv) Rules applicable to online service providers under the e-Commerce Directive.
Relevance / obsolescence	<p>Is EU action (sector specific action) still necessary?</p> <p>Does the problem that justified the introduction of the provisions still exist?</p>
EU added value	<p>Can or could similar changes have been achieved at national/regional level, or did EU action provide clear added value?</p> <ul style="list-style-type: none"> To what extent is there still a need to continue action at EU level by maintaining/establishing sector specific legislation? What is the additional value resulting from the implementation of the EU regulatory framework for electronic communications?

Source: WIK Consult/CRIDS based on European Commission (2015), Better Regulation Guidelines, SWD (2015) 111.

In assessing the degree of fragmentation, we frequently make use of the *coefficient of variation (CV)*. The coefficient of variation is a statistical measure of the dispersion of data points in a data series around the mean. It represents the ratio of the standard deviation to the mean. Since we use the CV as a measure of the dispersion of some indicator among the Member States, the greater the CV, the greater the degree of fragmentation among the Member States. A CV of zero would denote that there is no fragmentation at all across the Member States.

1.2.5 Delineation of possible Options for regulatory policymaking going forward

The final step in the project consists of

- appraising likely future developments in each of the three substantive domains analysed (taking into account not only identifiable current trends, but also possible landmark changes in market and technology development), and
- delineation of possible Options for regulatory policy-making.

The appraisal of likely future developments without changes to the policy being considered corresponds to the formulation of the baseline scenario of an Impact Assessment, while the delineation of Options has been based on Impact Assessment methodology as defined in the 2015 *Better Regulation Guidelines*.

The appraisal of likely future developments serves to identify the more likely future evolutionary paths. The study of possible landmark changes helps to identify areas of uncertainty.

A key bridge between backward-looking assessment of performance of the RFEC described in Section 1.2.4 and the forward-looking delineation described here is a series of *SWOT analyses* (covering *Strengths*, *Weaknesses*, *Opportunities* and *Threats*) respectively associated with the RFEC thematic areas that are covered by this study. This represents a fairly simple and easily grasped way of presenting the results of this task. The SWOT analysis drives the delineation of Options. The Options respond to a definition of the Problem, which can be driven by the need to mitigate the Weaknesses and Threats identified by the SWOT, and to capitalise on the Strengths and realise the Opportunities. Our use of SWOT analysis in this study is detailed in Section 3.1.1.

In this study, in light of the presence of multiple substantive domains with complex interrelationships, we have chosen to provide a more granular approach to the Options than is customary by developing candidate *Action Lines*. Each of these seeks to address one or more aspects of the Problem (and thus to mitigate one or more Weaknesses or Threats). These candidate Action Lines were then grouped together into Options, bearing in mind that some appear in more than one Option.

The Action Lines were crafted in view of the most likely scenarios for market and technological evolution. For each substantive domain, we also discussed possible responses to more disruptive but less likely scenarios such as faster-than-expected shifts from fixed to mobile networks (see Section 3.2.2 of the report), or gains in the effectiveness of dynamic spectrum management (see Section 3.2.3 of the report).

1.3 Legal provisions and instruments analysed

This study analyses the functioning of key legal provisions of the regulatory framework for electronic communications that are relevant to each of the substantive domains and respective thematic areas covered by the study, i.e. market entry, scarce resources (access to radio spectrum, access to numbers, access to land) and general end-user protection (end-user rights, must carry and EPG rules). The functioning of these key provisions is examined over time from the time of enactment of the RFEC and its transposition by the Member States, with overall conclusions for the cluster of key legal provisions for each thematic area relating to the situation as of today. Therefore, references are made in this report (except where explicitly stated otherwise) to the versions of the directives and provisions in force at the time of writing.

The key RFEC legal provisions addressed in this study are listed in Table 2. Table 2 includes provisions which are part of the RFEC, but which were not explicitly evaluated based on careful review of the legal text and our expert judgment as to whether the provision in question might conceivably have had a non-trivial impact on the performance of the RFEC in the substantive domains covered by the study. The RFEC provisions that were explicitly evaluated in Chapter 2 are identified in Table 2.

For each RFEC provision addressed, Table 2 notes whether the provision in question was amended in 2009. In many instances, the amendments did not affect the functioning of the RFEC to an extent that suggests that there might be a difference in performance prior to and after the implementation of the amendment concerned.

Numerous legal instruments that are not part of the RFEC as such have applied (and continue to apply) to the aspects of the electronic communications sector assessed in this study, as detailed where relevant in Chapters 2 and 3. Table 2 lists these documents and legal instruments.

Table 2: RFEC legal provisions and other legislative instruments and documents that are addressed in this study

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009? ⁹	Other legislative instruments and documents
General provisions¹⁰	Article 4 FWD	Right of appeal		X	<ul style="list-style-type: none"> Commission Directive 2002/77/EC on competition in the markets for electronic communications networks and services
	Article 6 FWD	Consultation and transparency mechanism		X	
	Article 8 FWD	Policy objectives and regulatory principles		X	
	Articles 20 FWD	Dispute resolution between undertakings		X	
	Article 21 FWD	Resolution of cross-border disputes		X	
	Article 21a FWD	Penalties		X	
	Article 10 AuD	Compliance with the conditions of the general authorisation or of rights of use and with specific obligations		X	
	Article 11 AuD	Information required under the general authorisation, for rights of use and for the specific obligations	X	X	

⁹ By the Better Regulation Directive 2009/140/EC or, in the case of the USD, by the Citizen's Rights Directive 2009/136/EC.

¹⁰ These provisions are "horizontal" to the regulatory framework and of relevance for the six thematic areas developed in the table.

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009?	Other legislative instruments and documents
Market entry and authorisation	Article 9a FWD	Review of restrictions on existing rights		X	<ul style="list-style-type: none"> Commission Recommendation 2003/203/EC on the harmonisation of the provision of public R-LAN access to public electronic communications networks and services in the Community Commission Recommendation 2008/295/EC on authorisation of mobile communication services on aircraft (MCA services) in the European Community Decision No 626/2008/EC of the European Parliament and of the Council on the selection and authorisation of systems providing mobile satellite services (MSS), Commission Decision 2009/449/EC on the selection of operators of pan-European systems providing mobile satellite services (MSS) Commission Decision 2011/667/EU on modalities for coordinated application of the rules on enforcement with regard to mobile satellite services (MSS) pursuant to Article 9(3) of Decision No 626/2008/EC Commission Recommendation 2010/167/EU on the authorisation of systems for mobile communication services on board vessels (MCV services).
	Article 3 AuD	General authorisation of electronic communications networks and services	X	X	
	Article 4 AuD	Minimum list of rights derived from the general authorisation			
	Article 5 AuD	Rights of use for radio frequencies and numbers	X	X	
	Article 6 AuD	Conditions attached to the general authorisation and to the rights of use for radio frequencies and for numbers, and specific obligations		X	
	Article 9 AuD	Declarations to facilitate the exercise of rights to install facilities and rights of interconnection			
	Article 12 AuD	Administrative charges	X		
	Article 14 AuD	Amendment of rights and obligations		X	

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009?	Other legislative instruments and documents
Scarce resources - Access to spectrum	Article 8a FWD	Strategic planning and coordination of radio spectrum policy	X	X	<ul style="list-style-type: none"> Commission Decision 676/2002/EC on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision) Commission Decision 2002/622/EC establishing a Radio Spectrum Policy Group (RSPG) Commission Recommendation 2009/848/EC facilitating the release of the digital dividend in the European Union Decision 243/2012/EU of the European Parliament and of the Council establishing a multiannual radio spectrum policy programme (RSPP) and notably its Article 9(2) Commission Implementing Decision 2013/195/EU defining the practical arrangements, uniform formats and a methodology in relation to the radio spectrum inventory established by Decision No 243/2012/EU Commission Implementing Decisions on Spectrum Harmonisation, incl. Decision 2007/344/EC of 16 May 2007 on harmonised availability of information regarding spectrum use within the Community and up to Decision (EU) 2016/687 of 28 April 2016 on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible national use in the Union Commission Implementing Decisions on Spectrum Harmonisation, up to Decision (EU) 2015/750 of 8 May 2015 on the harmonisation of the 1452-1492 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Union The 2014 Commission Report on the implementation of the Radio Spectrum Policy Programme (COM 2014/228)
	Article 9 FWD	Management of radio frequencies for electronic communications services	X	X	
	Article 9a FWD	Review of restrictions on existing rights		X	
	Article 9b FWD	Transfer or lease of individual rights to use radio frequencies	X	X	
	Article 5 AuD	Rights of use for radio frequencies and numbers	X	X	
	Article 6 AuD	Conditions attached to the general authorisation and to the rights of use for radio frequencies and for numbers, and specific obligations		X	
	Article 7 AuD	Procedure for limiting the number of rights of use to be granted for radio frequencies		X	
	Article 8 AuD	Harmonised assignment of radio frequencies			
	Article 13 AuD	Fees for rights of use and rights to install facilities	X		
	Article 14 AuD	Amendment of rights and obligations		X	
	Annex to AuD	Maximum conditions which may be attached to general authorisations, rights to use radio frequencies, and rights to use numbers		X	

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009?	Other legislative instruments and documents
Scarce resources - Access to numbers	Article 10 FWD	Numbering, naming and addressing	X	X	<ul style="list-style-type: none"> Commission Decision 2007/116/EC on reserving the national numbering range beginning with 116 for harmonised numbers for harmonised services of social value ITU-T (2010), Recommendation ITU-T E.164 (11/2010), The International Public Telecommunication Numbering Plan Regulation (EU) 2015/758 of the European Parliament and the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/ECC EU Delegated Regulation No 305/2013 with regard to the harmonised provision for an interoperable EU-wide eCall Regulation (EU) 2015/758 of the European Parliament and the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/E
	Article 6 AuD	Conditions attached to the general authorisation and to the rights of use for radio frequencies and for numbers, and specific obligations		X	
	Article 13 AuD	Fees for rights of use and rights to install facilities	X		
	Annex to AuD	Maximum conditions which may be attached to general authorisations, rights to use radio frequencies, and rights to use numbers		X	
	Article 27 USD	European telephone access codes	X	X	
	Article 27a USD	Harmonised numbers for harmonised services of social value, including the missing children hotline number	X	X	

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009?	Other legislative instruments and documents
Scarce resources - Access to land	Article 11 FWD	Rights of way	X	X	<ul style="list-style-type: none"> Commission Directive 90/388/EEC on competition in the markets for telecommunications services, as amended (especially Article 4d) Directive 2014/61/EU of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks
	Article 12 FWD	Co-location and sharing of network elements and associated facilities for providers of electronic communications networks		X	
	Article 4 AuD	Minimum list of rights derived from the general authorisation			
	Article 9 AuD	Declarations to facilitate the exercise of rights to install facilities and rights of interconnection			
	Article 13 AuD	Fees for rights of use and rights to install facilities			
	Annex to AuD	Maximum conditions which may be attached to general authorisations, rights to use radio frequencies, and rights to use numbers		X	

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009?	Other legislative instruments and documents
General end-user protection - End-user rights related to e-communications and services provided through them	Article 5 AD	Powers and responsibilities of the national regulatory authorities with regard to access and interconnection			<ul style="list-style-type: none"> Commission Recommendation 2012/798/EU of 12 December 2012 on the notification procedure provided for in Article 22(3) of Directive 2002/22/EC services Regulation (EU) 2015/2120 laying down measures concerning open internet access Council Decision 91/396/EEC on the introduction of a single European emergency call number European Parliament resolution of 5 July 2011 on universal service and the 112 emergency number The written declaration 100/2007 signed by 432 Members of the European Parliament on early warning for citizens in major emergencies EU Delegated Regulation No 305/2013 with regard to the harmonised provision for an interoperable EU-wide eCall, Directive 2010/13/EC of the European Parliament and of the Council on Audiovisual Media Services Directive 2000/31/EC of the European Parliament and of the Council on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market ('Directive on electronic commerce') Directive 2011/83/EC of the European Parliament and of the Council on Consumer Rights and EU guidance document on Directive 2011/83/EU Council Directive 93/13/EEC on unfair terms in consumer contracts Directive 2006/114/EC of the European Parliament and of the Council on concerning misleading and comparative advertising Regulation (EU) N° 524/2013 of the European Parliament and of the Council on online dispute resolution for consumer disputes Directive 2013/11/EU of the European Parliament and of the Council on alternative dispute resolution for consumer disputes
	Article 6 AD	Conditional access systems and other facilities		X	
	Article 1 USD	Subject-matter and scope		X	
	Article 20 USD	Contracts	X	X	
	Article 21 USD	Transparency and publication of information	X	X	
	Article 22 USD	Quality of service	X	X	
	Article 23 USD	Availability of services		X	
	Article 23a USD	Ensuring equivalence in access and choice for disabled end-users		X	
	Art 24 USD	Interoperability of consumer digital television equipment			
	Article 25 USD	Telephone directory enquiry services		X	
	Article 26 USD	Emergency services and the single European emergency call number		X	
	Article 27a USD	Harmonised numbers for harmonised services of social value, including the missing children hotline number		X	
	Article 28 USD	Access to numbers and services		X	

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009?	Other legislative instruments and documents
General end-user protection - End-user rights related to e-communications and services provided through them (continued)	Article 29 USD	Provision of additional facilities		X	<ul style="list-style-type: none"> • Directive 2005/29/EC of the European Parliament and of the Council on concerning unfair business-to-consumer commercial practices in the internal market • Directive 2008/52/EC of the European Parliament and of the Council on certain aspects of mediation in civil and commercial matters • Regulation 2006/2004 on consumer protection cooperation (CPC) • Directive 1999/44/EC of the European Parliament and of the Council on certain aspects of the sale of consumer goods and associated guarantees • User-related provisions Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market (of the Services Directive)
	Article 30 USD	Facilitating change of provider	X	X	
	Article 33 USD	Consultation with interested parties		X	
	Article 34 USD	Out-of-court dispute resolution	X	X	
	Annex I USD	Description of facilities and services referred to in Article 10 (control of expenditure), Article 29 (additional facilities) and Article 30 (facilitating change of provider)		X	
	Annex II USD	Information to be published In accordance with Article 21		X	
	Annex III USD	Quality of Service parameters		X	
	Annex VI USD	Interoperability of digital consumer equipment referred to in Article 24		X	

Substantive domain / thematic area	RFEC legal provision	Description of RFEC legal provision	Evaluated	Amended in 2009?	Other legislative instruments and documents
General end-user protection – Must carry and EPG rules	Article 5 AD	Powers and responsibilities of the national regulatory authorities with regard to access and interconnection	X		<ul style="list-style-type: none"> Directive 2010/13/EU of the European Parliament and of the Council of 10 March 2010 on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive)
	Article 6 AD	Conditional access systems and other facilities	X		
	Annex I AD	Conditions for access to digital television and radio services broadcast to viewers and listeners in the community			
	Article 31 USD	"Must carry" obligations	X	X	
	Article 33 USD	Consultation with interested parties		X	

Source: WIK/CRIDS

1.4 What is Europe?

As far as geographic scope, there are many definitions of “Europe”. We take our basic definition as constituting the Member States of the European Union in each time period under discussion. The membership of the European Union has not been constant. Ten new Member States joined in 2004; Bulgaria and Romania in 2007; and Croatia in 2013. Finally, in light of the UK referendum of 23 June 2016, it is possible that there might be 27 Member States as of 2019.

Many multi-national organisations that are relevant to this study have membership that overlaps but does not exactly match this definition of Europe. For example, the management of spectrum and numbers is generally subject to decisions of the *European Conference of Postal and Telecommunications Administrations (CEPT)* and its *Electronic Communications Committee (ECC)*, which have 48 countries as members. For agreed military spectrum bands, NATO is an important element.

1.5 What is an OTT service?

The proliferation of IP-based *Over-the-Top (OTT) services* touches nearly every aspect of this study; consequently, it is useful to say a few words about our general approach at the outset.

Our general approach in previous work has been to define an over-the-top (OTT) service as an online service that can be regarded as potentially substituting for traditional electronic communications and audiovisual services such as voice telephony, SMS, video on demand and television.¹¹

This is in line with the definition of so-called OTT-0 and OTT-1 services that BEREC¹² recently proposed:¹³

- OTT-0: an OTT service that qualifies as an electronic communications service (ECS)
- OTT-1: an OTT service that is not an ECS, but potentially competes with an ECS

¹¹ Godlovitch, I., Kotterink, B., Marcus, S., Nooren, P., Esmeijer, J. and Roosendaal, A. (2015), “Over-the-Top (OTT) players: Market dynamics and policy challenges”, Study for the IMCO Committee of the European Parliament

([http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU\(2015\)569979_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569979/IPOL_STU(2015)569979_EN.pdf)).

¹² See Regulation (EC) No 1211/2009 of the European Parliament and of the Council of 25 November 2009 establishing the Body of European Regulators for Electronic Communications (BEREC) and the Office, [2009] O.J. L337/1, (“BEREC Regulation”).

¹³ BEREC (2016), Report on OTT services, BoR (16) 35, January 2016 (http://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/5751-berec-report-on-ott-services_0.pdf).

A key policy question going forward relates to the treatment of OTT-1 services, which are not subject to the RFEC today.¹⁴

Should the definition of ECS be extended to include OTT-1 services? Should it (or alternatively some new RFEC definition) be expanded to include online services that are neither OTT-0 nor OTT-1? Should any services that are not OTT-0 today be made subject to any specific RFEC obligations, irrespective of how they are defined?

Alternatively, is it possible to reduce regulatory asymmetries between traditional ECS and OTT services by eliminating regulation that is no longer needed (perhaps due to the technology or market evolution)? Is it possible to reduce regulatory asymmetries by replacing sector-specific regulation with horizontal regulation that has meanwhile been enacted at European level, or that could potentially be enacted at European level?

One can argue that services that compete with one another should (other things being equal) be subject to the same obligations. This seemingly straightforward principle is however difficult to apply in practice.

- Are the new services in fact effective substitutes, are they imperfect substitutes, are they economic complements, or are they something else?
- In view of market and technology developments, is the original rationale for the regulatory obligation really relevant today, not only to the traditional ECS but also to the online service that competes with it?
- How practical and proportionate is it to impose the same sector specific obligations on a new service that were historically applicable to the traditional service – would doing so impose unreasonably high costs?

These considerations are broadly in line with BEREC's approach,¹⁵ and suggest the need for a nuanced approach.

For the three substantive domains, our analysis of these issues is reflected in the candidate Action Lines and Options that appear in Chapter 3. See in particular Sections 3.3.2.2 and 3.3.3.2, which deal with the issue relative to market entry and the authorisation process. For OTT services and numbering, see Sections 3.5.2.1 and 3.5.3.1. For OTT services and end-user protection, see Sections 3.7.2.4 and 3.7.3.4. For OTT services and 'must carry' rules, see Section 3.8.3.1.

The results are explicitly reflected in two of the candidate Action Lines that we have put forward, namely Candidate Action Line 3 and Candidate Action Line 20.

¹⁴ The question does not arise for OTT-0 services, since they are by definition ECS and are already subject to the RFEC.

¹⁵ BEREC (2016), "Report on OTT services", BoR (16) 35, p. 38.

1.6 Structure of this report

Chapter 1 of this report explains the framework for analysis (see Section 1.2.3) for each of the three substantive domains (which are comprised of six thematic areas, as explained in Section 1.2), and the ex post assessment of the functioning of the RFEC (see Section 1.2.4) in each of the six thematic areas.

In Chapter 2, the key RFEC provisions relating to the three substantive domains are reviewed: (1) market entry and authorisation; (2) scarce resources in the form of spectrum, numbers and rights of way; and (3) end-user rights, including 'must carry' and EPGs as additional end-user issues.

Chapter 3 covers the appraisal of likely future developments and the delineation of Options going forward, as described in Section 1.2.5.

Chapter 4 provides a comprehensive list of references, including publications, legal references, and case law.

This is followed in Chapter 5 by a series of appendices that provide (1) a comprehensive list of relevant RFEC provisions; (2) selected results from the Commission's public consultation; (3) a list of stakeholders interviewed for this study, together with the questionnaire to which our interviewees were asked to respond; (4) further data on end-user switching; and (5) further data on 'must carry' obligations.

2 Market entry, access to scarce resources and end-user issues

In this chapter, we review the key framework provisions relating to the three substantive domains:

- market entry and authorisation (Section 2.1);
- scarce resources in the form of spectrum (Section 2.2), numbers (Section 2.3), and rights of way (Section 2.4); and
- end-user rights (Section 2.5), including ‘must carry’ and EPGs as additional end-user issues (Section 2.6).

For each of the substantive domains covered by the study, we review in this order

- technological and market evolution;
- key relevant provisions of the Regulatory Framework for Electronic Communications (RFEC);
- the current implementation of the RFEC;
- current institutional arrangements; and
- the performance of the relevant key provisions of the framework in terms of the standard *Better Regulation Guidelines* evaluation criteria of effectiveness, efficiency, coherence, relevance, and EU added value.

2.1 Market entry

This Section assesses the framework provisions on general authorisation. The Authorisation Directive¹⁶ can be seen as an attempt to ensure that there are no unnecessary impediments at Member State level to market entry on the part of competitors, also in support of cross-border entry. An explicit objective is the creation of an Internal Market for electronic communications services.

The chapter is structured as follows:

- Section 2.1.1 sets out major technological and commercial developments that impact on market entry.

¹⁶ Directive 2002/20/EC of the European Parliament and of the Council of 7 March 2002 on the authorisation of electronic communications networks and services (Authorisation Directive), [2002] OJ L108/21.

- Section 2.1.2 describes the provisions of the electronic communications framework in relation to authorisation.
- Section 2.1.3 provides an overview of the implementation of these provisions in the Member States.
- Section 2.1.4 addresses institutional issues.
- Section 2.1.5 provides an assessment of stakeholder comments.
- Section 2.1.6 assesses the framework provisions against the criteria of effectiveness, efficiency, coherence, relevance and EU value added.

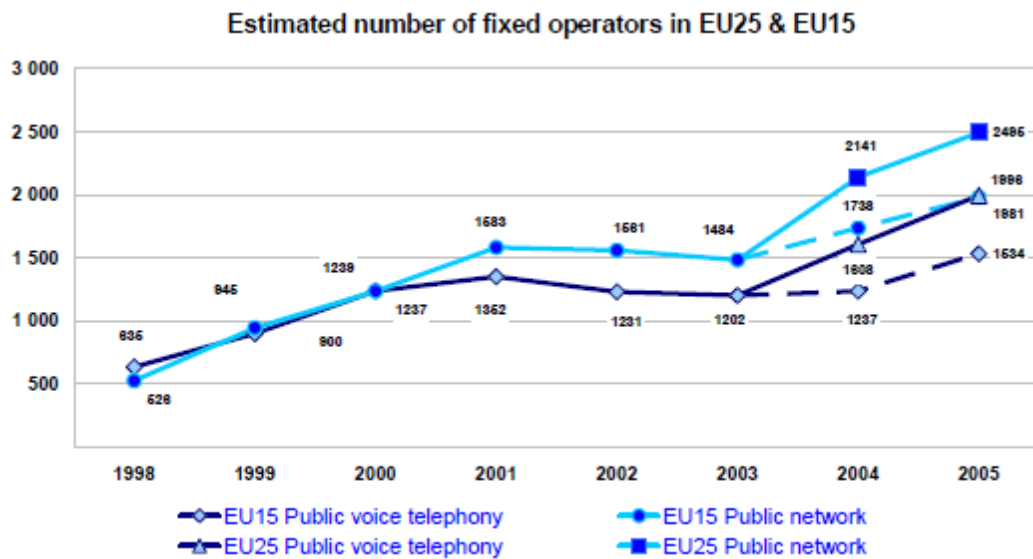
2.1.1 Key technological and commercial developments impacting on market entry

For networks and services, both fixed and mobile, substantial market entry has occurred since the enactment of the regulatory framework for electronic communications. For the fixed telephony network, Commission estimates from 2006 strongly suggest that the then-new RFEC enabled substantial competitive entry that might not have otherwise occurred (see Figure 3). The jump in the number of fixed operators of all types starting in 2003 is impressive and can be explained by the following considerations:

- The possibility to enter fixed electronic communications markets based on a general authorisation has removed legal and administrative barriers to entry.
- With a general authorisation system in place, the important driving force of entry into fixed retail markets, historically, are regulatory obligations for access and interconnection imposed on operators with SMP in the respective wholesale markets. Thus entry to retail markets for fixed telephony calls was initially driven by the availability of regulated wholesale fixed call origination (together with carrier selection and carrier preselection), wholesale fixed call termination and wholesale transit. Entry in retail markets for fixed telephone lines was made possible by wholesale line rental and the unbundled local loop. Entry to retail markets for broadband Internet access was driven by regulated wholesale bitstream access. Finally, new competitors could enter the market for retail leased lines based on regulated wholesale leased lines. Regulated wholesale access and interconnection enabled alternative operators to enter retail markets with little own network infrastructure, little sunk costs and limited risk.
- Growth expectations for fixed markets (voice telephony, broadband Internet access and leased lines) provided an additional stimulus for market entry. Commercial and technological trends, however, have modified growth

expectations in various respects. Traditional voice telephony is decreasing as a result of being substituted by IP telephony. In turn, fixed broadband markets continue to grow based on the trend towards very high capacity broadband connections and the integration of traditional network operators into television and other audiovisual services.

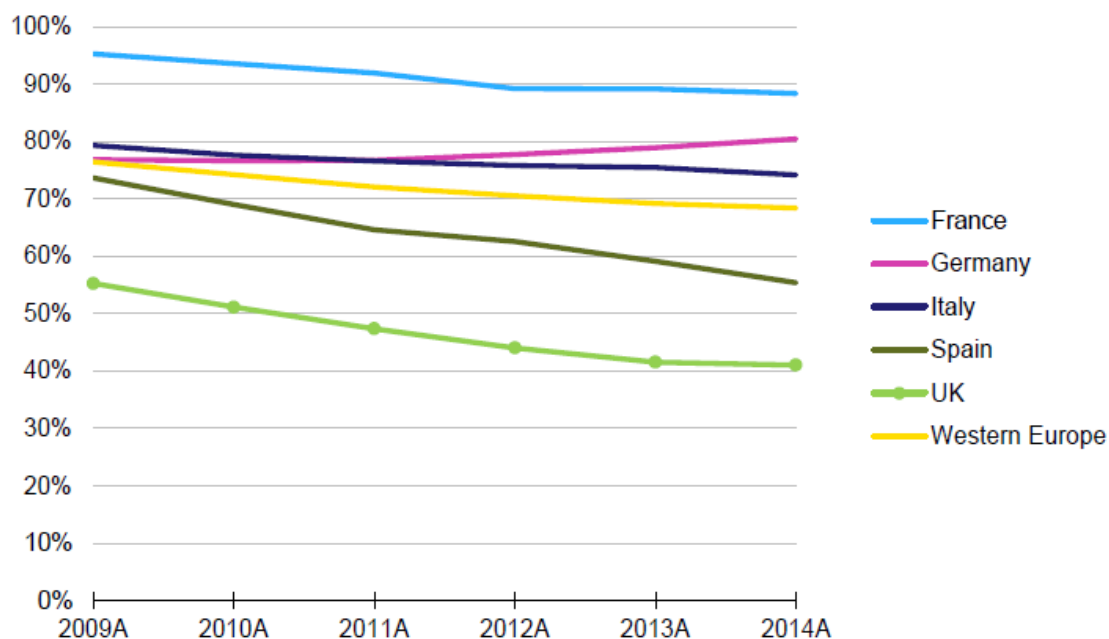
Figure 3: Estimated number of fixed operators in the EU 15 and EU 25, September 2005



Source: European Commission (2006), Annex to the European electronic communications regulation and markets 2005 (11th report). Commission staff working document. SEC (2006) 193 /Vol. 2, 20.2.2006.

Correspondingly, as a result of market entry, incumbent market shares have progressively declined since the enactment of the RFEC,¹⁷ albeit at different rates in different Member States and with occasional up-ticks (see Figure 4).

Figure 4: Incumbent's share of narrowband retail connections, EU5, 2009-2014



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Source: Analysys Mason (2015), International Benchmarking Report, Report for BT, 21 September 2015. (<http://www.analysysmason.com/About-Us/News/Press-releases/Broadband-benchmarks-Sept2015/Report/>).

As we further explain in Section 2.2.5.3.1, there has also been an overall tendency toward an increase in the number of Mobile Network Operators (MNOs) (see Table 19). This increase in the number of MNOs was made possible by the availability of new spectrum, notably in the 1800 and 2000 MHz frequency bands, and related licensing policies. Market entry of new MNOs, where they had acquired new spectrum, was driven by growth expectations in relation to mobile markets, notably in relation to mobile broadband services.

Meanwhile, there has been a proliferation of IP-based services, some of which could be termed Over-the-Top (OTT) services, including VoIP (see Section 1.5). This leads to

¹⁷ This presents a continuation of the trend of declining Incumbent market shares under the previous regulatory framework for electronic communications networks and services enacted at European level. See European Commission (2006), Annex to the European electronic communications regulation and markets 2005 (11th report). Commission staff working document. SEC (2006) 193/Vol. 2, 20.2.2006. Figure 8.

some ambiguity as to the boundaries of what must or must not be authorised. In the Commission's Public Consultation, our interviews, and elsewhere, some market players have advocated changes in the scope of the definition of Electronic Communication Services (ECS) to ensure that OTT services are also subject to Notification requirements.

2.1.2 Key framework provisions regarding market entry

From the full liberalisation of the EU electronic communications markets until the enactment of the RFEC, market entry for electronic communications network and services providers was mainly governed by:

- Article 2(3) of Directive 90/388/EEC¹⁸ as amended¹⁹, which provided "that Member States which make the supply of telecommunications services or the establishment or provision of telecommunications networks subject to a licensing, general authorisation or declaration procedure aimed at compliance with the essential requirements, shall ensure that the relevant conditions are objective, non-discriminatory, proportionate and transparent, that reasons are given for any refusal, and that there is a procedure for appealing against any refusal. The provision of telecommunications services other than voice telephony, the establishment and provision of public telecommunications networks and other telecommunications networks involving the use of radio frequencies, could be subjected only to a general authorisation or a declaration procedure".
- Directive 97/13/EC (Licensing Directive)²⁰ which detailed the conditions that could be attached to general authorisations and individual licenses. The Directive allowed the Member States to require individual licenses when access to radio frequencies or numbers was required, to give the licensee particular rights with regard to access to public or private land, as well as to impose obligations on the licensee relating to the mandatory provision of publicly available electronic communications networks or services, including obligations which require the licensee to provide universal service and other obligations under ONP legislation.

The Authorisation Directive took over the approach of the Licensing Directive, but further restricted the use of individual authorisations and further detailed the conditions

¹⁸ Commission Directive 90/388/EEC of 28 June 1990 on competition in the markets for telecommunications services, [1990] OJ L192/10.

¹⁹ by Art. 1(2) Commission Directive 96/19/EC of 13 March 1996 amending Directive 90/388/EEC with regard to the implementation of full competition in telecommunications markets, [1996] OJ L74/13.

²⁰ Directive 97/13/EC of the European Parliament and of the Council of 10 April 1997 on a common framework for general authorisations and individual licences in the field of telecommunications services, [1997] OJ L117/15.

that could be attached to such authorisations. Articles 3, 6 and 9 to 12 of the Authorisation Directive seek to limit national regulation to the minimum necessary. Without prejudice to the application of specific restrictions for foreign nationals laid down by national laws, regulations or administrative actions on grounds of public policy, public security or public health allowed under Article 52(1) TFEU²¹, Article 3 of the Authorisation Directive and Article 2(2) and (4) of the Competition Directive²² require Member States to subject the provision of electronic communications networks or services only to a general authorisation without the need to obtain an explicit decision or any other administrative act by the national regulatory authority (NRA). Therefore, an undertaking may at most be required to submit a notification to the NRA of its intention to provide electronic communications networks and/or services providing basic information on itself and on the planned activity, but does not need an explicit decision by the NRA concerned. The notification is in the interest of the undertakings concerned since it facilitates the exercise of their rights (see declarations established by the national regulatory authority under Article 9 of the Authorisation Directive). However, where authorisations imply the use of scarce resources such as numbers or radio frequencies, Member States may condition the provision of the commercial activity on the granting of individual rights of use, as discussed in Sections 2.2, 2.3 and 2.4 of this report.

Article 6 of the Directive provides a maximum harmonisation of the conditions that Member States may attach to the general authorisation: “The general authorisation for the provision of electronic communications networks or services (...) may be subject *only* to the conditions listed respectively in parts A, B and C of the Annex. Such conditions shall be non-discriminatory, proportionate and transparent and, in the case of rights of use for radio frequencies, shall be in accordance with Article 9 of Directive 2002/21/EC (Framework Directive)”. The conditions associated with the general authorisation are listed in Part A of the Annex to the Authorisation Directive and are the following:

1. financial contributions to funding of the universal service;
2. administrative charges imposed in order to cover the administrative costs of the implementation of the regulatory framework for electronic communications;
3. interoperability of services and interconnection of networks;
4. accessibility by end-users of numbers from the national numbering plan, numbers from the European Telephone Numbering Space, the Universal International Freephone Numbers, and, where technically and economically feasible, from numbering plans of other Member States;

²¹ Ex Art. 46 TEC to which Art. 3(1) AuD refers.

²² Commission Directive 2002/77/EC of 16 September 2002 on competition in the markets for electronic communications networks and services, [2002] OJ L249/21.

5. environmental and town and country planning requirements, as well as requirements and conditions linked to the granting of access to, or use of, public or private land and conditions linked to co-location and facility sharing and including, where applicable, any financial or technical guarantees necessary to ensure the proper execution of infrastructure works;
6. obligations to transmit certain television and radio broadcast channels and complementary services ("must carry");
7. rules on privacy protection;
8. sector specific consumer protection rules including conditions on accessibility for users with disabilities;
9. restrictions concerning the transmission of illegal and harmful content;
10. information to be provided in the declaration to the NRA of the intention to commence the provision of electronic communication networks or services and the submission of the minimal information which is required to allow the NRA to keep a register or list of providers of electronic communications networks and services and the information to be provided for specific purposes such as market reviews, verification of compliance or publication of comparative overviews of quality and price of services for the benefit of consumers;
11. enabling of legal interception by competent national authorities;
- 11a. terms for communications warning of imminent threats and mitigating the consequences of major catastrophes;
12. terms of use during major disasters or national emergencies to ensure communications between emergency services and authorities;
13. limitation of exposure to electromagnetic fields;
14. specific access obligations;
15. maintenance of integrity of public communications networks including prevention of electromagnetic interferences;
16. security of public networks against unauthorised access;
17. conditions, in specific circumstances, for the use of radiofrequencies when the granting of individual rights of use is not needed;
18. measures designed to ensure compliance certain standards and/or technical specifications;

19. transparency obligations on public communications network providers providing electronic communications services available to the public to ensure end-to-end connectivity, disclosure regarding any conditions limiting access to and/or use of services and applications where such conditions are allowed by Member States and, where necessary and proportionate, access by NRAs to such information needed to verify the accuracy of such disclosure.

In addition to conditions 2 and 12 which are specific to the Authorisation Directive and with the exception of conditions 11a and 12, the conditions foreseen by Part A of the Annex recall, explicitly or implicitly (e.g. condition 19 referring notably to Article 5 of the Framework Directive and to Articles 20-22 of the Universal Service Directive²³), obligations already provided for in other Directives. While this clearly shows that the “general authorisation” is in fact the legal framework applicable, the legal technique used is however not the most transparent from the perspective of potential market entrants. Where Member States follow the same legislative technique, market entrants will need to look for the respective specific legal acts detailing the substantive obligations under each of the conditions listed in Part A of the annex to the Authorisation Directive as transposed in national law. An alternative would have been to include both the possible substantive sector specific obligations, where these obligations are allowed by the EU Directives from the RFEC and Article 6 of the Authorisation Directive and its Annex in the same legal act (e.g. conditions 4 and 5).

The Directive also specifies the types of measures that Member States may take in order to verify and enforce compliance with these conditions. According to Article 10(1) and 11 of the Authorisation Directive,²⁴ NRAs may monitor and supervise compliance with the requirements of the general authorisation. Where an undertaking does not comply with one or more of these conditions and does not remedy the breaches within the set time period, Article 10(2) to (7) foresee that the relevant authorities may be empowered to take steps to correct the breach, which can include the imposition of financial penalties. In cases of serious and repeated breaches, they may in extreme cases prevent an undertaking from continuing to provide a network or service.²⁵

Article 11 limits the information to be required from undertakings to that which is strictly necessary and proportionate and adds that no information shall be required prior to and/or as a condition to start operating with the exception of information needed in the context of procedures for and assessment of requests for granting rights of use (Article 11(1), first sub-para (c) and second sub-para; this issue will be further discussed later in this section).

²³ Directive 2002/22/EC of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive), [2002] OJ L108/51 (also “USD”).

²⁴ On the provision of information by undertakings providing electronic communications networks and services to NRA, see also Art. 5(1) Framework Directive.

²⁵ See also Art. 21a Framework Directive stating that Member States shall adopt and apply appropriate, effective, proportionate and dissuasive penalties applicable to infringements of the national regulatory frameworks for electronic communications.

Article 12 allows for administrative charges to be levied by the NRA on undertakings providing a service or a network under the general authorisation. These charges are to cover costs incurred in the management, control and enforcement of the general authorisation scheme, and may include costs for international cooperation, harmonisation and standardisation, market analysis, monitoring compliance and other market control, as well as other regulatory work. Their imposition requires NRAs to publish a yearly overview of their administrative costs and of the total sum of the charges collected. Where there is a discrepancy, the appropriate adjustment must be made. As regards the way the total administrative cost is allocated to the various market players, recital 31 AuD specifies that “Systems for administrative charges should not distort competition or create barriers for entry into the market (...). An example of a fair, simple and transparent alternative for these charge attribution criteria could be a turnover related distribution key. Where administrative charges are very low, flat rate charges, or charges combining a flat rate basis with a turnover related element could also be appropriate”.

Furthermore, Article 13 allows for fees to be levied in order to ensure the optimal use of scarce resources, i.e. rights of use for radio frequencies (see Section 2.2.2), numbers (see Section 2.3.2) or for rights to install facilities on, over or under public or private property (see Section 2.4.2). Fees must be objectively justified, transparent, non-discriminatory and proportionate to the intended purpose of their imposition. They must also take into account the objectives foreseen by Article 8 of the Framework Directive. The relevant authorities may for example use auction procedures leading to substantive spectrum fees where these procedures promote competition by “*encouraging efficient use and ensuring effective management of radio frequencies*” according to Article 8(2)(d) of the Framework Directive.

According to the Court of Justice,²⁶ Member States may not, within the framework of the Authorisation Directive, levy any charges or fees in relation to the provision of networks and electronic communication services other than those provided for by Articles 12 and 13. Also according to the Court of Justice,²⁷ however, not all administrative charges and fees are covered by the Authorisation Directive. For Articles 12 and 13 to be applicable to a charge or a fee, the trigger for that charge or fee must

²⁶ Judgments in Case C-346/13 *Ville de Mons v. Base Company*, ECLI:EU:C:2015:649, para 16; Joined Cases C-55/11, C-57/11 and C-58/11, *Vodafone España v. Ayuntamiento de Santa Amalia (C-55/11) and Ayuntamiento de Tudela (C-57/11) and France Telecom España SA v. Ayuntamiento de Torremayor (C-58/11)*, ECLI:EU:C:2012:446, paras 28 - 29 and Joined Cases C-256/13 and C-264/13 *Provincie Antwerpen v. Belgacom (C-256/13) and Mobistar (C-264/13)*, ECLI:EU:C:2014:2149, para 30.

²⁷ See Court of Justice, judgments in Case C-346/13 *Ville de Mons v. Base Company*, ECLI:EU:C:2015:649, para 17; Case C-416/14 *Fratelli De Pra and SAIV v. Agenzia Entrate - Direzione Provinciale Ufficio Controlli Belluno and Agenzia Entrate - Direzione Provinciale Ufficio Controlli Vicenza*, ECLI:EU:C:2015:617, para 41; Case C-485/11 *Commission v. France*, ECLI:EU:C:2013:427, paras 30, 31 and 34; and Case C-71/12, *Vodafone Malta and Mobisle Communications v. Avukat Ġenerali and Others*, ECLI:EU:C:2013:431, paras 24 - 25.

be linked to a general authorisation procedure, which ensures rights for the provision of electronic communications networks or services.

Member States were required to transpose the provisions of the Directive into national law by 24 July 2003 at the latest. Each Member State has developed its own form and procedures for obtaining a general authorisation.

According to Article 4 of the Authorisation Directive, the general authorisation²⁸ gives companies the right to deploy electronic communications networks benefitting from rights of way or procedures for the expropriation of property and to provide electronic communications networks and services. When they provide electronic communications networks or services to the public, they are entitled²⁹ to:

- negotiate interconnection with or obtain access to or interconnection from other providers of publicly available communications networks and services in accordance with the Access Directive³⁰; and
- be designated to provide certain universal service functions on all or parts of the national territory, in accordance with the Universal service Directive.

Article 14(1) of the Authorisation Directive foresees that Member States must ensure that the rights, conditions and procedures regarding general authorisation may only be amended in objectively justified cases and in an appropriate manner. Except where the proposed amendments are minor and have been agreed with the addressee(s) of the general authorisation, appropriate notice of the intention to make amendments must be given; further, interested parties, including end-users and consumers, must be enabled to express their views on the proposed amendments during a minimum period of (in principle) four weeks.

Finally, according to Article 15 of the Authorisation Directive, relevant information concerning the rights, conditions, procedures, and administrative charges relating to general authorisations must be published, readily accessible, and kept up to date.

As in other economic sectors, undertakings entering the electronic communications markets in the Member States are subject to generally applicable national law, whether it be as regards the registration as a commercial company, the registration for VAT purposes, the payment of taxes and contributions, procedures for access to land (see Section 2.2), the ex post application of competition rules to their market behaviour, labour and social security law, or the protection of consumers.

²⁸ Art. 2(2)(a) Authorisation Dir, .

²⁹ Art. 4 Authorisation Directive..

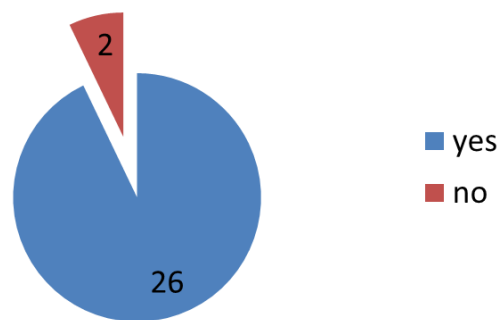
³⁰ Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive), [2002] OJ L108/7.

2.1.3 Implementation of key framework provisions in relation to authorisation of market entry

2.1.3.1 Notification requirements under Article 3(2) and (3) AuD

Except for Denmark and the UK, notification is required in all EU Member States. In Denmark, neither licensing nor registration of operators (except for mobile licences) has been required since 1996. In the UK, no notification is required at this time, although Section 33 of the Communications Act of 2003 refers to an advance notification to Ofcom.³¹ Up to now, however, Ofcom has not designated any electronic network or service under section 33 of the Communications Act; thus, Ofcom has not exercised its power to require a formal notification.

Figure 5: Notification requirement in EU Member States as of February 2016



Source: WIK Consult/Cullen International.

In all Member States where notification is required, the NRA is the addressee. In Italy, the Ministry of Economic Development must also be notified. In Spain, the Ministry of Industry is according to the general telecoms law 2014 competent to receive notifications and manage the operators' register, but this competence has not yet been transferred from the regulator CNMC (the date is to be set by an order of the Ministry of the Presidency, and has not yet been defined).

Regarding the procedural and information requirements, some EU Member States have more stringent requirements than others. According to Article 3(3) of the Authorisation Directive, for example, "...information must be limited to what is necessary for the identification of the provider, such as company registration numbers, and the provider's

³¹ http://www.legislation.gov.uk/ukpga/2003/21/pdfs/ukpga_20030021_en.pdf

contact persons, the provider's address, a short description of the network or service, and an estimated date for starting the activity”.

In the recent past, six countries (Czech Republic, Greece, Hungary, Romania, Slovakia, Portugal) had notification requirements that went beyond requirements stated in Article 3(3). Five countries have abolished these following Commission action, and only the Czech Republic still applies additional notification requirements. The Commission has noted that it is currently pursuing infringement proceedings against the Czech Republic based on a preliminary ruling of the European Court of Justice in 2014 (UPC DTH Sàrl v Nemzeti Média (C-475/12)), according to which EU law [i.e. Article 56 TFEU] precludes the imposition of national registration requirements in addition to those provided for in the Authorisation Directive, and must be interpreted as meaning that operators cannot be required to establish branches or a separate legal entity in the country where the services are provided.³²

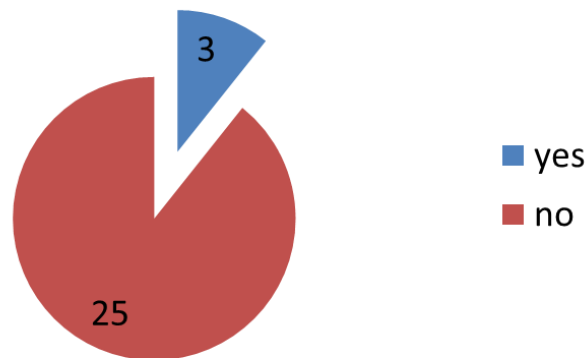
In most Member States, a written notification is necessary. In five of 28 EU Member States, notification can be done electronically. In Austria, the RTR offers an e-government portal for submitting a notification. In Estonia, only electronic submissions are allowed from 1 July 2016. In France, ARCEP offers an online registration form on its website. In Ireland, ComReg offers an electronic register. Spain offers the possibility to submit its notification either by paper or electronically.

In three of 28 EU Member States (Latvia, Malta, and Slovenia), foreign EU operators are required to undergo registration or tax formalities beyond those of the Authorisation Directive.³³ This is arguably somewhat at odds with the Authorisation Directive; however, as noted in Section 2.1.2, undertakings entering the electronic communications markets in the Member States are subject to generally applicable national law, whether it be as regards the registration as a commercial company, the registration for VAT purposes, or the payment of taxes and contributions.

³² European Commission (2015), Implementation of the EU regulatory framework for electronic communications - 2015 (Implementation Report), section 4.2, p. 15 (<https://ec.europa.eu/digital-single-market/en/download-scoreboard-reports>). See also Case C-475/12, *UPC DTH v. Nemzeti Média- és Hírközlési Hatóság Elnöksége*, ECLI:EU:C:2014:285 paras 96-106 and especially 106.

³³ In Malta, any firm incorporated outside the country must provide an MFSC OC certificate (i.e. must register). In Latvia, all foreign operators must register with the Latvian Enterprise Register (or else establish a company in the country) prior to acquiring the right to provide ECS in Latvia. In Slovenia, foreign operators must either establish a company subsidiary with headquarters in Slovenia, or must contact the Slovenian tax administration in the area where they plan to provide service, fill out the DR-04 form, and obtain a Slovenian tax number.

Figure 6: Registration requirements in EU Member States for foreign EU based operators as of February 2016



Source: WIK Consult/Cullen International.

2.1.3.2 Administrative charges

According to Article 12 of the Authorisation Directive, “*administrative charges should be imposed in an objective, transparent and proportionate manner. The charges should only cover the administrative costs [...]*”.

Administrative charges addressed in this section are the one-off notification charges and annual revenue-based charges levied on all notified electronic communications providers. These charges do not include separate administrative charges assessed by NRAs related to the management of scarce resources, such as frequencies and numbers. Administrative charges related the use of frequencies and numbers are further discussed in Sections 2.2 and 2.3.

Administrative charges apply in 24 out of 28 EU Member State countries. In Denmark, a notification is not necessary and therefore no administrative charges are imposed, i.e. neither one-off nor annual administrative charges. A similar regime without any notification-related charges also applies in Estonia, France and Germany, although in these three countries there is an explicit notification requirement. In the Czech Republic, there are no annual administrative charges for notified operators, but there is a one-off charge paid in connection with the notification.

In the UK, although no notification is required, annual administrative charges must be paid by operators providing activities “designated”³⁴ by Ofcom under section 38 of the Communications Act 2003. The UK practice shows that a notification requirement (as foreseen under Section 33 of the Communication Act 2003) is not indispensable for an NRA to collect administrative charges. In the UK, OFCOM has *“processes in place to facilitate the identification of relevant persons including publishing the list of providers who are charged every year. If we identify any new stakeholders who have not submitted their turnovers and/or not self certified, we act on them and pursue them to submit the relevant turnover for the current and previous years.”*³⁵

Overall charge setting approaches differ between Member States. Seven out of 28 EU Member States impose one-off administrative charges for notification. 19 out of 28 EU Member States impose annual administrative charges covering recurring costs to monitor the undertakings’ compliance with legislation. In most Member States, annual administrative charges are based on a percentage of the annual turnover of a company, although often only where turnover exceeds a threshold (marked red in Figure 7). For those countries (proceeding from right to left in the diagramme), the following thresholds apply: Malta: € 23,29 mio. (first tranche); Cyprus: € 200 mio.; Ireland: € 500.000; Greece: € 150.000; Bulgaria: BGN 100.000; Sweden: SEK 5 mio.; Austria: € 300.000; UK: £ 5 mio.; Slovakia: € 150.000; Netherlands: € 2 mio.; and Poland: PLN 4 mio.

³⁴ See Notice of Designation under Section 38 and 34 of the Communications Act 2003 (para 6., but also para 3)

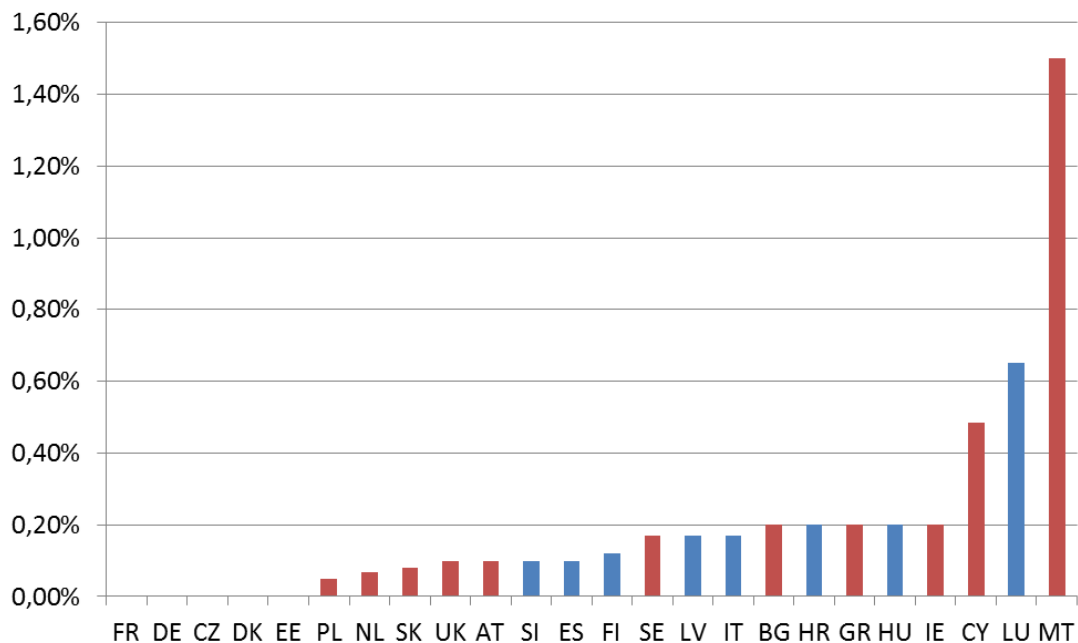
(<http://stakeholders.ofcom.org.uk/binaries/consultations/designation/statement/designation.pdf>).

Designation can refer to undertakings “providing [a] Network or Service, or making available [an] Associated Facility [that] had a Relevant Turnover from Relevant Activities of £ 5 million or more in the last but one calendar year prior to the charging year in question”.

³⁵ See reply of OFCOM from 20 April 2009 to an information request

(https://www.whatdotheyknow.com/request/funding_of_ofcom)

Figure 7: Annual administrative charges (percent of turnover), 2016



Source: WIK Consult/Cullen International.

2.1.4 Institutional functioning

Access to electronic communications markets is governed only by national authorisation procedures, with the sole exception of the specific case of the mixed authorisation of pan-European systems providing mobile satellite services (MSS) where (under Decision No 626/2008/EC)³⁶ the Commission selected the two operators to which the Member States had to grant authorisations at national level in accordance with the Authorisation Directive (in a second stage) so that the selected operators could provide MSS services to the public. The Authorisation Directive does not introduce a system of mutual recognition of national authorisations and notifications and does not avoid double jurisdiction, contrary to for example the Audiovisual Media Services Directive,³⁷ which establishes the “country of origin principle”. At the same time, the Authorisation

³⁶ Decision No 626/2008/EC of the European Parliament and of the Council of 30 June 2008 on the selection and authorisation of systems providing mobile satellite services (MSS), 2008 OJ L172/15.

³⁷ Art. 3 of Directive 2010/13/EU of the European Parliament and of the Council of 10 March 2010 on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive) (codified version), [2010] OJ L 95/1, *corr.* [2010] OJ L263/15, (also “AVMSD”).

Directive does not achieve full harmonisation. The Court of Justice has emphasized³⁸ that as regards authorisation requirements relating to consumer protection, Member States may go beyond the rules set out in the Universal Service Directive, which (as mentioned in Section 2.5.7) applies without prejudice to Community rules on consumer protection, in particular Directives 93/13/EEC and 97/7/EC.

The absence of full harmonisation has an immediate impact on the single market for electronic communications services with a reach beyond a single Member State, such as today's satellite communications services. Moreover, the same would tend to hold for OTT services when considered to fall within the definition of electronic communications services (ECS). In both cases, the electronic communications services concerned will be subject to the administrative authorities of all the Member States in which the recipients of those services are resident, and not only to those of the authorities of the Member State in whose territory the undertaking supplying those services is located. Undertakings providing cross-border services or located in a different Member State from their clients may thus be required, before starting the activity, to submit a notification to the national regulatory authorities of all Member States in which any of their clients reside. The notification must contain the minimal information required to enable those authorities to keep a register. The Court of Justice stresses that *"as EU law currently stands, the Authorisation Directive does not lay down any obligation for the competent national authorities as regards the recognition of authorisation decisions taken in the State from which the services concerned are supplied"; "therefore, the Member State in whose territory the recipients of the electronic communications services are resident may make the provision of those services subject to certain conditions, in accordance with the provisions of that directive"*.³⁹

BEREC has in particular examined the impact of administrative requirements on the provision of transnational business electronic communication services.⁴⁰ While recalling that it is up to the Member States *"to intervene on the national implementation patterns of the general authorisation regime"*, BEREC proposed a number of best practices such as the possibility to file online notifications/declarations, to simplify the regime of the documents to be submitted to NRAs, especially concerning certified translations, to submit notifications in English language and to establish a "contact point". Moreover BEREC advocated a harmonised format for notifications that would be used by NRAs in all EU countries, with standardised categories of networks and services and possibility to submit a description of the services which do not fall within any standard category. On the other hand, BEREC was more cautious regarding the "one stop shop"

³⁸ Court of Justice, Case C-522/08 *Telekomunikacja Polska v. Prezes Urzędu Komunikacji Elektronicznej*, ECLI:EU:2010:135, para 29 and Case C-543/09 *Deutsche Telekom v. Bundesrepublik Deutschland*, ECLI:EU:2011:279, para. 41.

³⁹ Case C-475/12 o.c., paras 86 - 87.

⁴⁰ BEREC (2015), Report on the impact of administrative requirements on the provision of transnational business electronic communication services, BoR (11) 56, 8 December 2011 (http://berec.europa.eu/eng/document_register/subject_matter/berec/download/0/120-berec-report-on-the-impact-of-administra_0.pdf).

mechanism put forward by some stakeholders. BEREC considered that “*interventions on EU and national legislations may be necessary in view of any implementation of a system of this sort, that certainly fall outside the remit of BEREC members*”⁴¹.

2.1.5 The views of stakeholders

Overall, established market players were consistent in stating in our interviews that for them, the need for authorisation was a less important aspect than many others.

This does not mean, however, that there is no longer a need for sector-specific regulation at EU level for authorisation. In fact, over half of the respondents to the Commission’s public consultation felt that sector-specific authorisation provides EU added value.⁴²

In our interviews, some providers of ECS argued that other online services (for instance, non-ECS OTT services that compete with ECS) should also be subject to an obligation to obtain an authorisation.

This view is more or less consistent with the consultation responses. Many ECS network operators expressed a need to better ensure a level playing field *vis-à-vis* OTT service providers, either through further deregulation, or alternatively by making OTT service providers subject to obligations similar to those that apply to providers of ECS.⁴³ With regard to whether OTT service providers should be able to enter the market without attendant formalities such as a notification, responses differed.⁴⁴

With regard to annual administrative charges, some market players argued that the current practice of assessing charges based on turnover leads to an inappropriately great burden on larger market players.

2.1.6 Performance of RFEC provisions relating to authorisation

2.1.6.1 Effectiveness

Effectiveness in the promotion of competition

The general authorisation regime has significantly decreased administrative barriers to entry and thus contributed to market entry and competition. Instrumental in this regard were the following provisions:

⁴¹ *Ibid* p. 21.

⁴² See response to Q 12d.

⁴³ See responses to Q 12.

⁴⁴ See responses to Q 123.

- Article 3 and 5(1): General authorisation and notification;
- Article 4: Minimum list of rights derived from the general authorisation;
- Article 6(1) - (3) and Annex A: Exhaustive list of conditions attached to general authorisation;
- Article 9: Declarations to facilitate the exercise of rights to install facilities and rights of interconnection;
- Article 10: Compliance with conditions;
- Article 11: Harmonised information required from undertakings;
- Article 12: Harmonised administrative charges;
- Article 14(1): Amendment of rights, conditions and procedures concerning general authorisations;
- Article 15: Publication of information.

This set of provisions facilitated, for both fixed and mobile markets, substantial market entry, enabling meaningful competition in most Member States. As previously noted, a visible increase in the rate of market entry in the fixed network occurred after enactment of the RFEC, and market shares of incumbents have generally declined (see Section 2.1.1). Market entry has also occurred for mobile networks (see Section 2.1.1).

While the general authorisation regime has facilitated market entry and competition, these were also driven by the regulatory regimes for access and interconnection and for access to numbers and rights of way as well as (notably for mobile) for access to spectrum.

Effectiveness in the promotion of the internal market

The general authorisation regime – again through decreasing administrative barriers to entry – also promoted the internal market. Instrumental in this regard were the following provisions:

- Article 3 and 5(1): General authorisation and notification
- Article 4: Minimum list of rights derived from the general authorisation
- Article 6(1) - (3) and Annex A: Exhaustive list of conditions attached to general authorisation
- Article 9: Declarations to facilitate the exercise of rights to install facilities and rights of interconnection

- Article 11: Harmonised information required from undertakings
- Article 12: Harmonised administrative charges
- Article 14(1): Amendment of rights, conditions and procedures concerning general authorisations
- Article 15: Publication of information

While the provisions (including the limitation to a notification requirement) contributed to the internal market, the lack of mutual recognition constitutes a remaining barrier.

Stakeholder interviews

In interviews, all established market players were clear in stating that the authorisation regime was not a problem for them. This is consistent with our perception. We believe that the regime is achieving its stated purpose.

Detailed provisions among the Member States are quite diverse; for existing market players, however, this is perceived as only a minor issue. No established market player interviewee considered the current regime to be problematic as regards entry for their respective firms. However, interviewees speculated that for small, new entrants who seek to do business in many Member States, there may be some tendency for existing procedures to deter market entry, given that they would need to follow different notification procedures in each of the 28 Member States. This is consistent with the consultation responses, where more alternative providers (MVNOs, SP) than established providers (ECS, MNOs) see an added value if notification requirements were standardised at EU level.

Large differences in regard to authorisation charges might possibly disadvantage either small or large market players in some Member States. Again, no interviewee identified high charges as an impediment to entry, but a few large network operators felt that turnover-based charges posed a burden that was not proportionate.

Major revisions to the scope of the definition of Electronic Communications Services (ECS) have been suggested by some market players. Whether this is appropriate is something that we will consider in Section 3.

2.1.6.2 Efficiency

Further reduction in administrative burden is possible, especially because the notification in most Member States has to be done in writing. Notification procedures are already low in administrative burden; however, further reduction in administrative burden might be possible.

Two Member States, the UK and Denmark, do not require a formal notification at all. Others Some Member States (e.g. Austria, Estonia, France and Ireland) permit the notification to be filed online. A further burden reduction could therefore be achieved through electronic notification. In addition, a common form in the English language that all Member States are obliged to accept might further reduce burden for smaller firms that wish to register in multiple Member States.

2.1.6.3 Coherence

Under Article 3(2) of the Authorisation Directive, undertakings wishing to enter the market may only be required to submit a notification, but may not be required to obtain an explicit decision or any other administrative act by the national regulatory authority before exercising the rights stemming from the general authorisation. However, Article 11(1) last subparagraph of the same Directive foresees that a national regulatory authority may require undertakings to provide information needed for procedures for and assessment of requests for granting rights of use prior to, or as a condition for, market access.

It is not clear whether general market access, independently from requests for individual rights of use, is concerned or not. The exact scope of the term ‘assessment’ is also unclear. Article 11(1) last subparagraph of the Authorisation Directive could open the door to a system of prior approval as a condition of market access.

2.1.6.4 Relevance

The provisions of the Authorisation Directive dealing with market entry through a system of general authorisation exist in large measure to prevent Member States from imposing needless burdens on market entry⁴⁵. These provisions continue to be relevant. In the absence of instruments that achieve what these provisions achieve, administrative burdens associated with market entry would with high probability be substantially greater than they are today, and would thus impede achievement of the objectives of competition and of promotion of the Internal Market.

2.1.6.5 EU added value

The licensing regime that existed prior to implementation of the Authorisation Directive would not have been able to facilitate competitive entry to the same degree as the current regime, especially in the Member States that joined the EU after 2004. Barriers to market entry would be higher⁴⁶ because individual licences could be required, e.g.

⁴⁵ See also Authorisation Directive, rec 7 - 8.

⁴⁶ The Commission for example expressed concerns regarding “a certain lack of transparency with regard to licence conditions (Ireland), the level of licence fees (Germany, France, (...)), and time-limits for the issue of licences (Belgium, Greece, France, Italy, Luxembourg). In some countries (Belgium,

for the provision of publicly available voice telephony services and public electronic communications networks.

Similar effects to those achieved by the Authorisation Directive could also not have been achieved solely by uncoordinated actions at Member State level.

The positive effect of the Authorisation Directive seems to be corroborated by the visible increase in the rate of fixed network market entry (see Figure 3) after the RFEC came into force.

2.1.6.6 Conclusions

Overall, market entry arrangements are working well. There is however scope for minor improvements in market entry mechanisms (not including scarce resources issues, which are addressed elsewhere).

2.2 Access to scarce resources – spectrum

The Section is structured as follows:

- Section 2.2.1 summarises the key technological and commercial trends relevant for spectrum.
- Section 2.2.2 describes key RFEC provisions regarding access to spectrum.
- Section 2.2.3 assesses the implementation of these provisions.
- Section 2.2.4 looks at institutional functioning.
- Section 2.2.5 looks at outcomes and problem areas.
- Section 2.2.6 assesses the provisions with regard to the *Better Regulation* criteria.

2.2.1 Key technological and commercial developments regarding spectrum

In the years since the last review of the framework, we observe a strong increase in demand for spectrum. There is a clear expectation that future spectrum usage across

Spain, Italy, Austria) there are concerns with regard to the lengthy or cumbersome licence procedures". See Communication from the Commission, Fourth Report on the Implementation of the Telecommunications Regulatory Package, COM(1998) 594 final of 25.11.1998, p.17 (http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=3483).

many frequencies will increase significantly over the coming years.⁴⁷ In particular, there is a growing spectrum demand for both mobile and Wi-Fi which is mainly driven by the growth in the use of audio-visual services on tablets, smartphones and other devices.⁴⁸

In discussing spectrum requirements, we follow the Commission's practice in the Annex of the "Commission Implementing Decision 2013/195/EU of 23 April 2013 defining the practical arrangements, uniform formats and a methodology in relation to the radio spectrum inventory established by Decision No 243/2012/EU of the European Parliament and of the Council establishing a multiannual radio spectrum policy programme",⁴⁹ which defines the following application groupings for purposes of analysis of trends, needs and demand:

- Aeronautical, Maritime and Civil Radiolocation and Navigation Systems
- Broadcasting (terrestrial)
- Cellular/BWA
- Defence Systems
- Fixed Links
- Intelligent Transport Systems (ITS)
- Meteorology
- PMR/PAMR
- PMSE
- PPDR
- Radio Astronomy
- Satellite Systems
- Short Range Devices (SRDs)
- WLAN/RLAN⁵⁰

⁴⁷ For more details see Analysys Mason (2013), Spectrum policy – Analysis of technology trends future needs and demand for spectrum in line with Article 9 of the RSPP, FINAL Report, A study prepared for the European Commission DG Communications Networks, Content & Technology – SMART 2012/0005., page 76 ff. (<https://ec.europa.eu/digital-single-market/news/final-report-analysis-technology-trends-future-needs-and-demand-spectrum-line-art-9-rspp>).

⁴⁸ WIK-Consult/AEGIS (2013), Study on impact of traffic off-loading and related technological trends on the demand for wireless broadband spectrum, A study prepared for the European Commission DG Communications Networks, Content Technology .

⁴⁹ (2013), OJ L113/18.

⁵⁰ For the rationale for this taxonomy, see Annex 3 of Marcus J.S., J. Burns, F. Pujol, and P. Marks, (2012), "Inventory and review of spectrum use: Assessment of the EU potential for improving spectrum efficiency. Study for the European Commission. Bad Honnef, 11 September 2012.

At this point, we would like to highlight technological developments for four applications which we will describe in more detail later on:

- *Wireless broadband access*: LTE Advanced will offer higher speeds and better quality of service to mobile customers, as well as a wider range of services, thus encouraging greater data consumption. There is a strong demand for spectrum for launching and expanding LTE / LTE Advanced networks.
- *Terrestrial broadcasting*: Future demand for spectrum for broadcast largely depends on the introduction of second generation transmission standards (DVB-T2) and advanced data compression technologies (MPEG-4 and HEVC) for digital terrestrial TV, on the number and business models of TV channels that markets are able to sustain, and on the effect of new TV quality standards (UHDTV and 3DTV).
- *Fixed Links*: The increasing demand for bandwidth is leading to the migration to higher frequency links (over 6 GHz) that offer greater capacity. The ongoing growth in mobile data traffic will drive an increase in both the number of mobile base stations and the traffic per base station in the short, medium and long term. This also translates into a growing need for high-bandwidth back-haul wireless links (as a complement to fibre-based links) from base stations to transport networks.
- *Public Protection and Disaster Relief (PPDR)*: Another trend is the need to support more data-intensive applications for PPDR (public protection and disaster relief) organisations. Video becomes important in order to enable commanders to see what is happening in the field. The need for a broadband data network dedicated to mission-critical applications is a discussion in Europe, and is already implemented in the U.S.

2.2.1.1 Wireless broadband access

The current mobile spectrum situation in Europe is governed by established Commission Radio Spectrum Decisions.⁵¹ Standardised mobile frequencies (typically below 4 GHz) are utilised. There are a number of 'traditional' mobile frequency bands: 900 MHz and 1800 MHz have been in use since the commencement of GSM in the early 1990's, and 2100 MHz since the commencement of 3G in 2000. The Spectrum Management Authorities (SMAs) within the EU Member States have been awarding new spectrum to Mobile Network Operators (MNOs) for 4G services in the 800 MHz and 2600 MHz bands over the past five to six years, and since 2015 in the 700 MHz band.

⁵¹ See Decision /2002/676/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision), [2002] OJ L108/1. For example: Commission Decision 2009/766/EC of 16 October 2009 on

These five core mobile bands are the most common mobile bands used by MNOs today and are now typically used for delivering mobile broadband. In some countries, the existing mobile bands have been *refarmed* to permit the use of different technologies from those initially intended, such as enabling UMTS technology rather than GSM in the 900 MHz band, and enabling LTE rather than GSM in the 1800 MHz band in some countries (which is to say that this band skipped the 3G mobile generation).

LTE is the most advanced technology standard used today for the provision of mobile broadband. LTE stands for *Long Term Evolution* (and is a registered trademark owned by the *European Telecommunications Standards Institute [ETSI]*) for wireless data communications technology. It is based on GSM/EDGE and UMTS/HSPA standards but incorporates a different, improved radio interface.⁵² The goal of LTE was to increase the capacity and speed of wireless data networks using new *Digital Signal Processing (DSP)* techniques and modulations that were developed around the turn of the millennium. A further goal was the redesign and simplification of the network architecture to an IP-based system with significantly reduced transfer latency compared to the 3G architecture.

The LTE wireless interface is incompatible with 2G and 3G networks, implying that it must be operated in a separate radio spectrum band or bands.

The LTE specification provides nominal downlink peak rates of 300 Mbit/s, uplink peak rates of 75 Mbit/s, and *Quality of Service (QoS)* provisions permitting a transfer latency of less than 5 ms in the radio access network. LTE has the ability to manage fast-moving mobiles, and it supports multi-cast and broadcast streams. LTE supports scalable carrier bandwidths, from 1.4 MHz to 20 MHz, and it supports both frequency division duplexing (FDD) and time-division duplexing (TDD).

The IP-based network architecture (referred to as the *Evolved Packet Core (EPC)*) is designed to replace the earlier GPRS Core Network. It supports seamless handovers for both voice and data to cell towers with older network technology such as GSM,

the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community, [2009] O.J. L274/32; and Commission Decision 2010/267/EU of 6 May 2010 on harmonised technical conditions of use in the 790-862 MHz frequency band for terrestrial systems capable of providing electronic communications services in the European Union, [2010] OJ L117/95; Commission proposal for a Decision of the European Parliament and of the Council on the use of the 470-790 MHz frequency band in the Union, COM(2016) 43, 2.2.2016. See also Council Directive 87/372/EEC of 25 June 1987 on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community, [1987] OJ L196/85, *corr.* O.J. 1987 L265/15 ("GSM Directive") and Directive 2009/114/EC of 16 September 2009 amending Council Directive 87/372/EC on the frequency bands to be reserved for the coordinated introduction of public pan-European cellular digital land-based mobile communications in the Community; O.J. 2009 L274/25; Commission Recommendation 2009/848/EC of 28 October 2009 facilitating the release of the digital dividend in the European Union, [2009] OJ L308/24.

⁵² Wikipedia contributors. "LTE (telecommunication)." Wikipedia, The Free Encyclopedia. Wikipedia, The Free Encyclopedia, 29 Apr. 2016. Web. 5 May. 2016.

UMTS and CDMA2000. The simpler architecture of LTE results in lower operating unit costs.

ECO Report 03⁵³ on the licensing of mobile bands in Europe presents the most recent information available to the European Communications Office (ECO) on the licensing of the following frequency bands in CEPT countries: 694-790 MHz; 790-862 MHz; 880-915 MHz / 925-960 MHz; 1452-1492 MHz; 1710-1785 MHz / 1805-1880 MHz; 1900-1920 MHz; 1920-1980 MHz / 2110-2170 MHz; 2010-2025 MHz; 2300-2400 MHz; 2500-2690 MHz; 3400-3600 MHz / 3600-3800 MHz. The information in this ECO Report is updated via the EFIS⁵⁴ database on the basis of the information collected from CEPT administrations. The data set is designed to provide the assigned spectrum within these bands for each Member State.

In order to address future spectrum requirements in general and demand for mobile broadband in particular, the European Commission set a target for Member States to make available 1200 MHz for mobile broadband by 2015 in its RSPP Decision (Decision 243/2012/EU) defining the first multiannual radio spectrum policy programme.⁵⁵ Meanwhile, the GSMA projects a demand for 1600 - 1800 MHz of sub-6 GHz spectrum for mobile broadband by 2020, thus implying a potential need for 400 MHz to 600 MHz of additional sub-6 GHz spectrum across Europe over the next four years.⁵⁶ Actual spectrum requirements can be expected to depend both on the technologies that deploy in the near to medium term, and on the uses made of those technologies.

LTE Advanced represents a significant enhancement to LTE. To purists, the moniker *4G* refers to LTE Advanced, but not to LTE (which for instance does not meet the minimum speed requirements initially planned for 4G). A key characteristic of LTE Advanced is *carrier aggregation*, which can treat multiple radio channels in different frequency bands as if they were one so as to achieve higher throughput than LTE, provided that sufficient aggregate spectrum is available.⁵⁷ There have been various trials, but it appears to be early days for actual production deployments in Europe.

⁵³ <http://www.efis.dk/views2/report03.jsp#searchForm>.

⁵⁴ The ECO Frequency Information System (EFIS) is the tool to fulfil Commission Decision 2007/344/EC of 16 May 2007 on harmonised availability of information regarding spectrum use within the Community, [2007] O. L129/67 and the ECC Decision, ECO Frequency Identification System (EFIS), ECC/DEC/(01)03 of 15 November 2001. (<http://www.erodocdb.dk/docs/doc98/official/pdf/ECCDec0103.pdf>).

⁵⁵ Decision No 243/2012/EU of the European Parliament and of the Council of 14 March 2012 establishing a multiannual radio spectrum policy programme, [2012] OJ L81/7

⁵⁶ GSMA (2015): The socio-economic benefits of greater spectrum policy harmonisation in the EU. November 2015 (<http://www.gsma.com/spectrum/wp-content/uploads/2015/12/Socioeconomic-benefits-of-harmonisation1.pdf>)

⁵⁷ See Computerworld (2015), As LTE-Advanced becomes more common, 4G speeds increase (<http://www.computerworld.com/article/2866944/as-lte-advanced-becomes-more-common-4g-speeds-increase.html>).

5G (denoting fifth generation mobile networks or fifth generation wireless systems) denotes the next anticipated major phase of mobile telecommunications standards beyond the current 4G/IMT-Advanced standards. 5G can offer speeds beyond what the current 4G can offer. The Next Generation Mobile Networks Alliance has defined the following requirements for 5G networks:⁵⁸

- Data rates of tens of megabits per second should be supported for tens of thousands of users;
- 1 gigabit per second to be offered simultaneously to many workers on the same office floor;
- Several hundreds of thousands of simultaneous connections to be supported for massive sensor deployments;
- Spectral efficiency should be significantly enhanced compared to 4G;
- Coverage should be improved;
- Signalling efficiency should be enhanced;
- Latency should be reduced significantly compared to LTE.

The commercial deployment of 5G networks starting circa 2020 is expected to be one of the most important trends in network environment over the next decade.⁵⁹ 5G will enable networks to cope with rapidly increasing data traffic, thanks to denser/smaller cells and even greater offloading to fixed networks via Wi-Fi links. It is hoped that 5G will integrate networking, computing and storage resources into one programmable and unified infrastructure which will allow for an optimised use of all distributed resources. Furthermore, 5G is expected to be a key enabler for machine-to-machine communications (M2M) and for the Internet of Things (IoT).

The Radio Spectrum Policy Group (RSPG)⁶⁰ has developed a draft roadmap on spectrum related aspects for next-generation wireless systems (5G) for Europe.⁶¹ The key RSPG conclusions are:

- that the 3400-3800 MHz band should be the primary band for the introduction of 5G use in Europe before 2020;

⁵⁸ <https://en.wikipedia.org/wiki/5G>.

⁵⁹ See BEREC (2015), BEREC Opinion on the Review of the EU Electronic Communications Regulatory Framework, BoR (15) 206, 10 December 2015., p. 28.

⁶⁰ Commission Decision 2002/622/EC of 26 July 2002 establishing a Radio Spectrum Policy Group, O.J. 2002 L198/49 ("Radio Spectrum Policy Group Decision" or "RSPG Decision").

⁶¹ RSPG (2016), Strategic Roadmap towards 5G for Europe, DRAFT RSPG Opinion on spectrum related aspects for next generation wireless systems (5G), RSPG16-031 FINAL, Brussels, 8. June 2016.

- that 5G will also need to be deployed in bands already harmonised below 1 GHz, including particularly the 700 MHz band, in order to enable nationwide and indoor 5G coverage;
- that there will be a need to ensure that technical and regulatory conditions for all bands already harmonised for mobile networks are fit for 5G use; and
- that among bands above 6 GHz for 5G, it is best to focus on the bands identified by WRC-15, in particular the bands 24.5-27.5 GHz; 31.8-33.4 GHz; and 40.5-43.5 GHz.

As noted in the RSPG roadmap, many of the technologies now being considered for 5G are well suited to frequencies above 6 GHz, which has historically been of only limited interest to most commercial users. Enormous bandwidth is available in the high frequency bands being considered for 5G; however, they tend to be suitable only for short distances.⁶² Consequently, 5G might well entail large numbers of small cells in dense areas, as well as more sharing with existing applications.

Where broad coverage is needed, however, lower frequencies would be far more cost-effective. Our assessment is that most deployments of 5G are likely in practice to use a mix of small and large cells at frequencies and cell densities that are tailored to specific characteristics such as population density and usage density. Thus, various spectrum bands below 6 GHz that are already allocated to WAPECS use are likely to be used for 5G by some network operators in some countries.

Whether cells are large or small, the increasing bandwidth demand will tend to make fibre-based back-haul attractive. Where fibre-based back-haul is not feasible, fixed wireless services are likely to be used instead (see Section 2.2.1.4).

Key implications of this ongoing evolution include:

- A possible need for additional individually assigned spectrum user rights below 6 GHz, and a probable need for additional individually assigned spectrum user rights above 6 GHz.
- Probable increased need (and increased ability) for spectrum sharing in all of its forms, including licence exempt and hybrid models.

2.2.1.2 Increasingly flexible network configuration

There is also a trend towards the *virtualisation* of network functions through various approaches such as *Software Defined Networks (SDN)* and *Network Function*

⁶² The propagation characteristics at these frequencies limit the range over which operation is feasible due to atmospheric attenuation, reflections, and low penetration through walls.

Virtualisation (NFV). Virtualisation results from the implementation of network functions in the "cloud" such as set-top boxes, mobile signal encoding/decoding, firewall, routing schemes and traffic prioritisation. This means that functions are based on software servers, instead of locally-distributed and dedicated hardware equipment run by the network operators. Some speculate that network virtualisation might facilitate the emergence of pan-European electronic communication networks and services, or that it might enable new forms of competition (and cooperation) among network operators.

Yet another driving force in network technologies and operations concerns the shift to "all-IP" networks. This transition, which drives and has been driven by the gradual roll-out of *Next Generation Networks (NGNs)*, implies moving the point of interconnection for voice services from distributed local central offices to a central point in the network, thereby enabling cost savings for operators as well as a more efficient network management (including across countries).

New issues may arise from these developments such as:

- greater needs for fixed back-haul for mobile networks, and less clear distinctions between access and back-haul networks as wireless networks densify;
- growing demand for virtual network infrastructures accessed and programmed from the core of networks;
- new vertical applications (or 'verticals') based on specific network platforms with dedicated features and performance requirements (e.g. latency rather than throughput for gaming, high reliability and low latency for health or automotive, etc.);
- possible opportunities for network operators to expand their portfolio to services beyond the mere provision of connectivity and to offer integrated M2M platforms and M2M services themselves (constituting new forms of vertical integration).

The combined implications of these changes would appear to include:

- Enhanced price/performance for network operators.
- Increased flexibility for network operators, with associated cost savings.
- Increasing traffic is likely to drive both (1) greater capacity needs over the airlink, and (2) greater need for fixed back-haul.
- Enabling M2M platforms and services.
- Enabling vertical applications based on specific network platforms with dedicated features and performance requirements.

2.2.1.3 Terrestrial broadcasting⁶³

Although many platforms are now available for the distribution of (linear) video content,⁶⁴ terrestrial broadcasting remains a widely used television platform among a large proportion of consumers in certain Member States of the EU. In Italy and Spain, more than 85% of households receive television signals via DTT; at the same time, it must be noted that in Belgium, Germany, the Netherlands, and Slovenia, less than 10% of households receive television signals via DTT.⁶⁵

DTT can be viewed as being important not only because it is still widely used in many Member States, but also because it contributes to media pluralism by helping to ensure that culturally significant channels (including *Public Service Broadcasters [PSBs]*) are available to segments of the population that might not be willing or able to pay to receive the same content via cable, satellite, or other media.

The spectrum usage demand for broadcast mainly depends on:

- the rise in use of new television quality standards by existing channels (HDTV, UHDTV and 3DTV) and the extent to which their use is offset by improvements in compression techniques (MPEG4 and HEVC);
- the number of television channels that each market will be able to sustain;
- the potentially limited gains from adopting *Single Frequency Networks (SFNs)* and the corresponding issues of international coordination;
- the digitalisation of terrestrial television (analogue switch-off/digital switchover) in Central and Eastern Europe; and
- the decline of DVB-H in favour of mobile broadband as a means of providing video services on the move.

Spectrum below 1 GHz can be expected to continue to be greatly desired for broadcast due to its excellent characteristics in terms of propagation and building penetration.

⁶³ See Analysys Mason (2013), Spectrum policy – Analysis of technology trends future needs and demand for spectrum in line with Art. 9 of the RSPP, FINAL Report, a study prepared for the European Commission DG Communications Networks, Content & Technology, p. 54 ff. (<https://ec.europa.eu/digital-single-market/news/final-report-analysis-technology-trends-future-needs-and-demand-spectrum-line-art-9-rspp>).

⁶⁴ In the last ten years, there has been a progressive digitalization of TV networks (cable, satellite and, more recently, terrestrial). Going forward, LTE broadcast appears promising. In addition, a combination of the development of IPTV (a managed IP-based TV service running either over a wired or wireless broadband access connection), the increasing take-up of video services (streaming, linear and video-on-demand (VoD)) provided over the Internet, and the proliferation of devices on which video services can be enjoyed (standard TVs, connected TVs, tablets, notebooks and smartphones) are changing the way viewers watch TV.

⁶⁵ Eurobarometer, E-communications and the digital single market, Special Eurobarometer, May 2016, p. 63. See also Figure 54 in Section 2.6.1.1.2.

The release of the 700 MHz band from DTT to mobile services, as agreed in some countries, further reduces the spectrum available for over-the-air broadcasting; whether this reduces the number of channels available, however, depends both on the rate of improvement in compression technology, and on the speed with which video services with higher resolution are deployed and adopted. Some other frequency ranges may be attractive as alternatives to 700 MHz in one Member State or another. For example, the UK is planning to award the 600 MHz spectrum band for broadcasting alongside PMSE, and the Finnish government has licensed three DTT MUXs to operate in VHF frequency bands. Other countries, however, might not offer any spectrum to compensate for the reduction of 700 MHz spectrum allocated to broadcasting, as seems to have been indicated by the government in France.

Key implications of the likely evolution of over-the-air broadcast include:

- Contention between broadcasting and mobile ECS (and also other services such as PPDR) for high value sub-1 GHz spectrum is likely to be with us for the foreseeable future.
- Details will change over time as technologies and markets mature, such as more widespread use of LTE-Broadcast technology.⁶⁶

2.2.1.4 Fixed wireless links⁶⁷

The fixed wireless service is and remains a key service for electronic communication infrastructure development. Point-to-point (PP) links are typically used within electronic communications core networks, and are likely to play an increasingly crucial role as a means of achieving back-haul to all kinds of small cells (including public Wi-Fi and 5G). They may also be used within local access networks (connecting users to the core network) and as broadcast contribution and distribution links.

The technological developments that are likely to have an impact on spectrum requirements are listed below:

- *Use of wider channels / higher frequencies:* For example by doubling channel sizes or by creating contiguous channels, demand of spectrum for fixed links is migrating towards higher frequencies (above 6 GHz, and increasingly above 40 GHz) with standards now existing for up to 100 GHz.

⁶⁶ Yle, Qualcomm and Nokia announced first demonstration of LTE Supplemental Downlink in a TV broadcast band (<http://yle.fi/aihe/artikkeli/2016/09/02/yle-qualcomm-and-nokia-announce-worlds-first-demonstration-lte-supplemental>).

⁶⁷ For more details, see Analysys Mason (2013), Spectrum policy – Analysis of technology trends future needs and demand for spectrum in line with Art. 9 of the RSPP, Final Report, A study prepared for the European Commission DG Communications Networks, Content & Technology, p. 76 ff. (<https://ec.europa.eu/digital-single-market/news/final-report-analysis-technology-trends-future-needs-and-demand-spectrum-line-art-9-rspp>).

- *Improved modulation techniques:* Advances in modulation schemes and coding (error correction) will allow for higher spectral efficiency for point-to-point fixed links.
- *Use of cross-polarisation, interference cancelation (XPIC):* An increased use of XPIC could double the capacity in a co-channel dual-polarisation (CCDP) application. This is already a well-established technology but it is now becoming more widespread, and so could potentially provide a reduction in spectrum usage demand in the medium term.
- *NLoS/QLoS back-haul:* NLoS/QLoS back-haul is a technique that could potentially be employed to provide back-haul for pico-cells. The propagation characteristics of lower frequencies (i.e. below 6 GHz) are likely to be desirable for this application. Commercially available equipment appears to use bands in the range 2.3 - 3.6 GHz.
- *Zero-footprint units:* Zero-footprint units are a new form of small, low-cost radio, which may be useful for delivering broadband links to rural areas where it is not economically viable to lay fibre, or where copper does not already exist. Lower-frequency chipsets will be cheapest, but are still likely to operate at well above 6 GHz. This technology trend is unlikely to have an impact on spectrum usage demand between 400 MHz and 6 GHz.
- *Other technology advances:* Other potential fixed-link trends include header compression, smaller dish sizes and synchronization improvements. They are only really relevant to higher frequencies, and so will have no impact on spectrum between 400 MHz and 6 GHz.
- *Fibre substitution:* as fibre connections become more common in the future, they will increasingly replace fixed wireless links as a method of providing network back-haul.

The overall future demand for spectrum for fixed wireless links depends on:

- The migration to higher speed fixed wireless links.
- The degree of substitution by fibre networks, which is likely to vary significantly between and within countries based on the degree of urbanisation and the affordability of fibre.

Currently, fixed services use spectrum in frequencies above 1 GHz. Most recently, frequency bands in the 60-80 GHz range are beginning to be used for very short, high bandwidth links (sometimes referred to as 'gigabit wireless' because the bandwidth may be 1 Gbit/s or more). It is of interest that the 60 GHz band is license exempt. Fixed links are ideally suited to sharing spectrum with other services such as radio astronomy.

Among the implications of these developments are:

- Fixed links operate in some of the same bands as certain cellular ECS services, but can also play a complementary role by providing back-haul (for instance, to small cells).
- To the extent that fixed links are directional, contention may be more manageable than with some other services.

2.2.1.5 PPDR⁶⁸

In the past, PPDR mobile communications have generally been based on Private Mobile Radio (PMR) technologies such as those used in the TETRA or Tetrapol networks used by the majority of police organisations in Europe. The most prominent spectrum in which it has been used is the 380-400 MHz band. Spectrum below 1 GHz is considered to be optimum for PPDR applications, due to its better propagation characteristics which allow larger areas to be covered from a single cell site, thus minimising infrastructure costs, and also due to its better building penetration characteristics (crucial for fire-fighters).

Analysys Mason (2013) identified the main driver for broadband PPDR to be the expected increase in demand for data-rich applications. These applications include the provision of more situational awareness, where the control room is aware of what is happening to an officer, and passing information to officers so they are aware of the environment. This is closely related to an increasing need for video from and to incidents and planned events, including video links from drones.⁶⁹

At present, demand is constrained by a lack of suitable sub-1 GHz spectrum for mobile broadband PPDR applications. If spectrum were made available for dedicated PPDR mobile broadband, users would need to work with regulators to plan for the networks, which would most likely be required from 2018 onwards. There are opportunities for low-frequency 400 MHz spectrum, but it would be more difficult to achieve harmonised spectrum in this case. 700 MHz spectrum is also a candidate in principle, although many services desire the use of 700 MHz spectrum. There is also a discussion of the

⁶⁸ Analysys Mason (2013), Spectrum policy – Analysis of technology trends future needs and demand for spectrum in line with Art. 9 of the RSPP, Final Report, A study prepared for the European Commission DG Communications Networks, Content & Technology, page 248 ff. (<https://ec.europa.eu/digital-single-market/news/final-report-analysis-technology-trends-future-needs-and-demand-spectrum-line-art-9-rspp>).

⁶⁹ See also Marcus, J. S. et al. (2010), PPDR Spectrum Harmonisation in Germany, Europe and Globally, a study for the German BMWi, December 2010 (http://www.cept.org/Documents/fm-49/1552/FM49_11_Info2_WIK_Report_PPDR_Spectrum_Harmonisation).

degree to which commercial mobile networks might be able to accommodate PPDR needs (and also the needs of energy and rail transport).⁷⁰

In CEPT, ECC Report 218 on the harmonised conditions and spectrum bands for the implementation of future European broadband PPDR systems⁷¹ was published in October 2015. This constituted an important step towards a CEPT harmonisation measure on spectrum for broadband PPDR. This work was carried further by the Electronic Communications Committee (ECC) in 2016.⁷² ECC Report 218 proposed the concept of “flexible harmonisation” to enable an efficient implementation of broadband PPDR within CEPT.⁷³ This includes three major elements:

- a common technical standard (i.e. LTE and its evolutions);
- national flexibility to decide how much spectrum and which specific frequency ranges should be designated for BB-PPDR networks within harmonised tuning range(s), according to national needs;
- national choice of the most suitable implementation model (either dedicated, commercial, or a hybrid broadband PPDR network solution).

Based on these considerations, CEPT does not consider it necessary to designate a single frequency band for broadband PPDR.

2.2.1.6 Technological trends for other applications

Private mobile radio / public access mobile radio (PMR, PAMR) is a term used to apply to a range of field radio communications applications used for business communications and a range of public services. The technologies are substantially the same as those used for emergency services (PPDR). Increasing use of smart grid and smart meters may drive new spectrum demand for PMR/PAMR in the future.⁷⁴

Programme Making and Special Events (PMSE) enables the staging of live events and the making of television programmes and films. Bandwidth requirements tend in consequence to be highly concentrated in areas where these activities take place.

⁷⁰ SCF (2015), Study on use of commercial mobile networks and equipment for mission critical high-speed broadband communications in specific sectors, SMART 2013-0016, on behalf of the European Commission, DG CONNECT.

⁷¹ CEPT (2015),: Harmonised conditions and spectrum bands for the implementation of future European Broadband Public Protection and Disaster Relief (BB-PPDR) systems, ECC Report 218 (Approved October 2015).

⁷² ECC (2016), “Harmonised technical conditions and frequency bands for the implementation of Broadband Public Protection and Disaster Relief (BB-PPDR) systems”, ECC Decision (16)02.

⁷³ This “flexible harmonisation” approach might be useful for applications other than PPDR.

⁷⁴ Analysys Mason (2013), Spectrum policy – Analysis of technology trends future needs and demand for spectrum in line with Art. 9 of the RSPP, Final Report, A study prepared for the European Commission DG Communications Networks, Content & Technology, page 248 ff. (<https://ec.europa.eu/digital-single-market/news/final-report-analysis-technology-trends-future-needs-and-demand-spectrum-line-art-9-rspp>).

Spectrum use largely consists of audio and video links from cameras and microphones to the production team. Spectrum demand is evolving largely as a function of changes in the type and number of events; the type of equipment; the increase in the amount of equipment per event; and the growing adoption of HD and 3D cameras.⁷⁵

Short-Range Devices (SRD) are low-power radio communications systems. SRD are used for a wide range of applications including Radio-Frequency Identification (RFID), machine-to-machine (M2M) communications and the Internet of Things (IoT), intelligent transport systems (ITS), and health and medical applications. All of these offer considerable potential for growth in usage; however, spectrum demand is moderated by the fact that the limited range of the devices enables extensive re-use of the same spectrum.⁷⁶

Operational rail communications generally are implemented using the GSM-R protocol. Bandwidth requirements are minimal, and are growing only slowly. Geographic coverage needs follow rail lines, but bandwidth demand may be far higher in yards and terminals than on long stretches in the countryside. A successor to GSM-R is felt to be needed by 2030 because it will no longer be practical to support the aging underlying GSM protocol.⁷⁷

2.2.1.7 Key spectrum management challenges ahead to deal with technological developments

2.2.1.7.1 Spectrum band harmonisation versus flexibility

In the context of spectrum bands, *harmonisation* refers to the adoption of common spectrum allocations and associated technical conditions of use (such as band plans and regulatory power limits). This kind of harmonisation is not a goal in itself, but rather a means of achieving other goals like an efficient usage of spectrum. Thus, harmonisation decisions need to be developed with careful consideration of the real value they are capable of delivering in comparison with the potential costs – a view which is much in keeping with the Commission's approach to *Better Regulation*.

⁷⁵ *Ibid.*

⁷⁶ *Ibid.*

⁷⁷ IDATE / WIK Consult (2015), Evolution of GSM-R, a study on behalf of the European Railway Agency, April 2015 (<http://www.era.europa.eu/Document-Register/Pages/Study-for-the-evolution-of-GSM-R-%28by-IDATE-WIK%29.aspx>).

Spectrum band harmonisation primarily seeks:

- to generate economies of scale, for example for the development of equipment;
- to facilitate cross border coordination;
- to enable or facilitate the ability of services to work EU-wide across borders (as for instance with roaming⁷⁸); and
- to facilitate the attractiveness and competitiveness of Europe overall.

Where there is momentum to use particular bands for particular services, enabling harmonisation measures can help the transition from concept to prospective deployment by helping to create the conditions for a critical mass of countries to commit to making the spectrum available and to seek to accelerate the deployment of the service in question. Doing so might make benefits available to Europeans sooner, or might create a critical mass effect within Europe so as to make the EU a more attractive place and market. Whether these benefits are realised in practice depends in general on whether the application in question deploys and is used to a sufficient extent – if not, the spectrum may lie fallow for some time.⁷⁹

Wireless equipment today can readily support multiple bands; consequently, scale economies and interoperability can often be achieved without full global harmonisation of spectrum bands. At the same time, it should not be assumed that it is costless for wireless equipment to support an unlimited number of bands. There can be implications in terms of the capacity of the chipsets that support wireless communication, and also in terms of antenna design. For some applications, harmonisation to the level of “tuning bands” (consider for instance the ECC approach to PPDR spectrum, as described in Section 2.2.1.5) may achieve a better balance of cost against benefits than full harmonisation of a band.

With this in mind, it is not always necessary to employ identical spectrum band solutions in all Member States at the same time. The amount of spectrum needed to meet the demand for particular services (such as for instance mobile broadband) can differ across Member States due to differences in consumption patterns, geography, demographics and population density. Member States may have different approaches to broadcasting, or to national security and defence considerations. This is reflected, for instance, in the approach taken in the Commission’s Implementing Decision on the harmonisation of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband electronic communications services and for flexible

⁷⁸ Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union, [2012] OJ L172/10 (“Roaming Regulation”).

⁷⁹ Many would argue that the under-utilised MSS band is a case in point.

national use in the Union.⁸⁰ The Implementing Decision allows flexible national use of certain parts of the 700 MHz frequency band on top of wireless broadband services, thus enabling selective implementation of public protection and disaster relief (PPDR), wireless microphones (audio PMSE), and machine-to-machine communications in Member States that choose to do so. This approach is in line with, for instance, CEPT/ECC Report 218,⁸¹ which proposes “national flexibility to decide on how much spectrum should be designated for PPDR within harmonised tuning range(s), according to national needs”.

A 2012 study for the European Commission⁸² assessed the technical efficiency of spectrum allocations in each frequency band from 400 MHz to 6 GHz for each of the Member States. Efficiency was judged on the basis of four indicators: utilisation, demand growth, technology and geography. The colours in Table 3 indicate the relative value of an overall efficiency indicator, obtained by combining the four individual efficiency criteria (utilisation, demand growth, technology and geographic). The rating for each band in each country is compared to the highest overall rating in all bands and all countries, which is defined as 100%. Red corresponds to 0%, which effectively means that the band is not in use and is unlikely to be brought into use in its current form. Harmonised bands are often, but not always efficiently used – the DAB band and several satellite bands provide conspicuous examples.⁸³ Conversely, non-harmonised bands are sometimes used with high efficiency in some Member States, but at low efficiency in others.

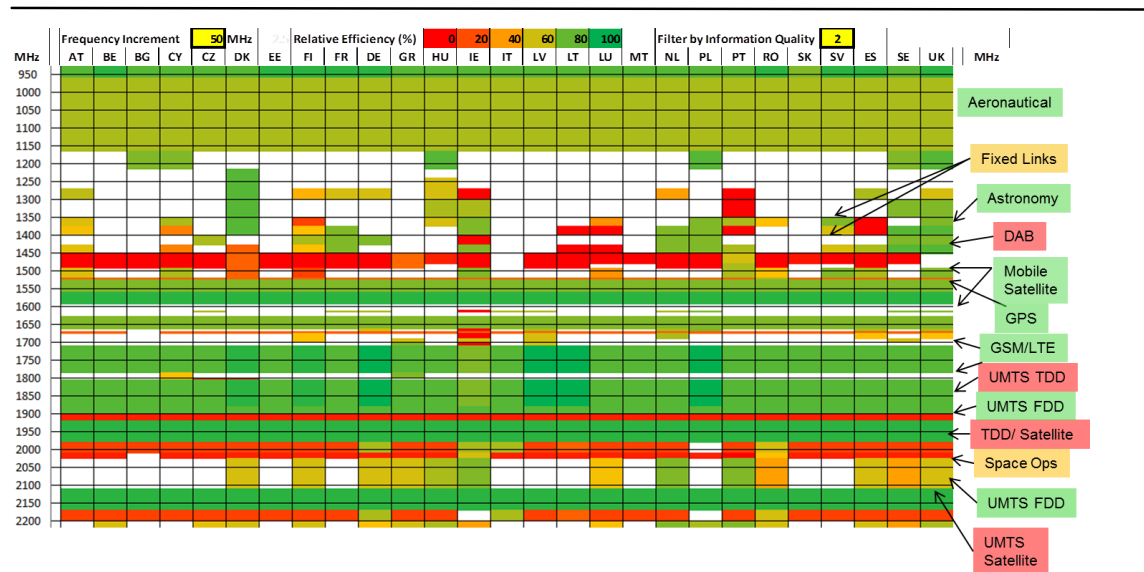
⁸⁰ European Commission, 27.4.2016, Commission sets out technical conditions to allocate more radio frequencies to mobile internet services (<https://ec.europa.eu/digital-single-market/en/news/commission-sets-out-technical-conditions-allocate-more-radio-frequencies-mobile-internet>).

⁸¹ CEPT (2015), Harmonised conditions and spectrum bands for the implementation of future European Broadband Public Protection and Disaster Relief (BB-PPDR) systems, ECC Report 218 (Approved October 2015), p. 2.

⁸² Marcus, J.S., J. Burns, F. Pujol, and P. Marks (2012), Inventory and review of spectrum use: Assessment of the EU potential for improving spectrum efficiency.

⁸³ Marcus, J.S., J. Burns, F. Pujol, and P. Marks (2012), op. cit. “Here we can clearly see that the spectrum identified for terrestrial TDD and mobile satellite elements of IMT-2000 in the 2 GHz region remains largely unused, 20 years after these allocations were made at the 1992 World Radio Conference. Similarly, the L band allocation to T-DAB (1452-1492 MHz) remains unused throughout most of the EU, with no active DAB deployments remaining in the band.”

Table 3: Comparison of technical efficiency in the 960 MHz – 2200 MHz range



Source: Marcus, J. S., J. Burns, F. Pujol. and P. Marks (2012), Inventory and review of spectrum use: Assessment of the EU potential for improving spectrum efficiency.

EU spectrum band harmonisation measures do not necessarily have to be mandatory or exclusive in nature. Flexibility might for instance be provided either through the time frame in which assignments must be made, or the exact bands to be used, or both. The benefits from harmonisation can often be maximised through a flexible approach: for example, setting out *tuning ranges* over which frequency-agile equipment should be able to operate (e.g. wireless microphones and cameras), rather than mandating that only a single band be used. Following such enabling harmonisation measures (generally based on technical conditions developed by CEPT), Member States then have a strong incentive to allocate spectrum based on those conditions to get the benefit of using standardised equipment.

Summing up, spectrum band harmonisation works best at a European level when there is a clear demand for new spectrum to be made available across all EU Member States for a particular service or application, and when the needs for spectrum for the application are not greatly different among the Member States. Where these conditions are not fulfilled, there is the risk that a band that has been set aside lays fallow to some degree, and is thus sterilised relative to other potential uses. This would represent an *opportunity cost* for Europe.

2.2.1.7.2 Flexibility to enable innovation

Generally, new services and economic growth will come from innovators at various levels of scale, some of whom may be less well equipped to navigate the regulatory environment. If small and start-up companies are to experiment with the same technologies that large, global operators are using, then they need to be able to access appropriate spectrum bands in a flexible fashion, and to do so rapidly.

Examples of enabling initiatives by national managers include test-and-trial licences, the establishment of web portals to inform spectrum users of the regulatory process, and various ways to facilitate a dialogue with regulators. Trials under way include work on connected cars, on future broadband technologies, and on licensed shared access. The availability of licence exempt / general authorisation spectrum is one of the simplest and most straightforward ways to foster innovation.

There is also some prospect for additional licence exempt bands to be allocated in response to market and technology developments.

Innovation in spectrum use often takes place well in advance of any formal standardisation and harmonisation activity. Thus, spectrum management framework should be sufficiently flexible and agile to support and encourage this innovation. Sometimes, innovation exploits existing standards (e.g. Wi-Fi or other licence exempt technologies). Where it focuses on a new use of spectrum, this may require flexible national spectrum access regimes which enable ad hoc spectrum allocation or assignment by means, for instance, of trial licences. Care is therefore needed to ensure that any regional or sub-regional harmonisation initiatives do not cause delays to the availability of spectrum for experimental purposes, or in inefficiencies in its use.

2.2.1.7.3 Spectrum sharing

Shared use of spectrum (in all of its many forms) can provide an alternative means of achieving flexibility and greater efficiency of use. A very wide range of techniques are used to enable the sharing of spectrum in Europe.⁸⁴ Sharing can be effected for instance in the frequency domain, in the time domain, or through geographic partitioning.

⁸⁴ This has been the focus of multiple studies, including at least two for the European Commission. See for instance Burns, J., P. Hansen, M. Marcus, P. Marks, F. Pujol, M. Redman (2006), Study on Legal, Economic, & Technical Aspects of 'Collective Use' of Spectrum in the European Community (http://europa.eu.int/information_society/policy/radio_spectrum/docs/workshop_collective_use/cus_rep_fin.pdf); and Forge, F., R. Horvitz and C. Blackman (2012), "Perspectives on the value of shared spectrum access". Report prepared for DG Information Society and Media, Electronic Communications Policy, Radio Spectrum Policy (Unit B4) as the Final Report of a study to provide support for the preparation of an impact assessment to accompany the Commission's Initiative on the Shared Use of Spectrum (SMART 2011/0017) (http://camfordassociates.com/wp-content/uploads/2013/08/scf_study_shared_spectrum_access_20120210.pdf)

The choice of a preferred spectrum sharing approach varies greatly depending on numerous factors, including the requirements of the application, the characteristics of the specific spectrum bands under discussion, and more.

Licence exempt access (typically in conjunction with Wi-Fi) is a particularly important form of sharing.

As we discuss in Section 2.2.3.2.7, some forms of *infrastructure sharing* constitute shared use of spectrum; others (such as sharing of masts) may not.

As devices become more intelligent, far more sophisticated forms of sharing are becoming possible. These newer forms of spectrum sharing are made possible thanks to advances in cognitive radio and other techniques for spectrum sharing and exploitation of white spaces. The idea of cognitive radio is that the system has the ability to be fully aware of its surrounding (i.e. the spectrum and its current state of use), and from this information it is able to choose the most suitable frequency on which to transmit. In this way, greater spectral efficiency can be achieved.

Many expect spectrum sharing to play a key role in achieving a more efficient management of spectrum in Europe.

Among the most relevant modern approaches for spectrum sharing are:

- *Licence exempt access*: As previously noted, this approach enables access to spectrum subject only to a general authorisation by devices that must be compliant with industry standards for low emissions and types of spectrum access. Devices must all share the same spectrum and are not protected from so called permissible or accepted interference.⁸⁵ Licence exempt spectrum already enables the hugely important use of Wi-Fi in the home and at work, and is increasingly prevalent for publicly available hot spots as well. Among the newer applications, White Spaces in the television UHF bands are made available in the UK on a licence exempt basis (rather than through awards), subject to database control.
- *Concurrent shared access*: This approach enables multiple operators to share access to the same portion of spectrum but in a coordinated and managed way. This may include geographical access for example.
- *Licensed shared access (LSA)*:⁸⁶ This approach enables incumbent licensed users to permit access to spectrum by way of a sub-licence thus enabling access to licensed spectrum but within a structured sharing framework.

⁸⁵ International Telecommunications Union (ITU) (2012), Radio Regulations: Articles: Edition of 2012.

⁸⁶ Licensed Shared Access (LSA) is a complementary tool that fits under an “individual licensing regime”. The implementation of LSA would rely on the concept of “sharing framework” that is currently under the responsibility of the Administration/NRA. The sharing framework” can be understood as a set of sharing rules or sharing conditions that will materialise the change, if any, in the spectrum rights of the incumbent(s) and define the spectrum, with corresponding technical and operational conditions,

2.2.2 Key framework provisions regarding access to spectrum

Spectrum assignment conditions

The Authorisation Directive seeks to harmonise national rules relating to the granting of rights to use radio frequencies where such use involves the provision of an electronic communications network or service, normally for remuneration.

Rights to use radio frequencies can be based on a non-exclusive general authorisation or on individual authorisations (e.g. exclusive spectrum licences). Under Article 5(1) of the Authorisation Directive, EU Member States may make the use of radio frequencies, where necessary, subject to the grant of individual rights with a view to:

- avoiding harmful interference;
- ensuring the technical quality of service;
- safeguarding efficient use of spectrum; or
- fulfilling other general interest objectives defined by EU Member States.

Under Article 6 and part B of the Annex to the Authorisation Directive, only the following conditions may be attached to the rights of use for radio frequencies, in addition to those that can be attached to general authorisations (see Section 2.1.2 above):

1. Obligation to provide a service or to use a type of technology for which the rights of use for the frequency has been granted, including, where appropriate, coverage and quality requirements.
2. Effective and efficient use of frequencies in conformity with Directive 2002/21/EC (the Framework Directive).
3. Technical and operational conditions necessary for the avoidance of harmful interference and for the limitation of exposure of the general public to electromagnetic fields, where such conditions are different from those included in the general authorisation.
4. Maximum duration in conformity with Article 5 of the Authorisation Directive, subject to any changes in the national frequency plan.

that can be made available for alternative usage under LSA. LSA facilitates the introduction in a frequency band of new users while maintaining incumbent services in the band. LSA aims to ensure a certain level of guarantee in terms of spectrum access and protection against harmful interference for both the incumbent(s) and LSA licensees, thus allowing them to provide a predictable quality of service. LSA excludes concepts such as “opportunistic spectrum access”, “secondary use” or “secondary service” where the applicant has no protection from primary user(s). LSA licensees and incumbents operate different applications and are subject to different regulatory constraints. They would each have exclusive individual access to a portion of spectrum at a given location in time.

5. Transfer of rights at the initiative of the right holder and conditions for such transfer in conformity with Directive 2002/21/EC (the Framework Directive).
6. Usage fees.
7. Any commitments which the undertaking obtaining the usage rights has made in the course of a competitive or comparative selection procedure.
8. Obligations under relevant international agreements relating to the use of frequencies.
9. Obligations specific to an experimental use of radio frequencies.

The usage fees referred to in the preceding list are distinct from any administrative charges. Under Article 13 of the Authorisation Directive, usage fees can be imposed for the rights of use for radio frequencies to reflect the need to ensure the optimal use of these resources. Member States must, when imposing such usage fees, ensure that the fees are objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and shall take into account the objectives in Article 8 of the Framework Directive.'

Spectrum assignment procedures

Under Articles 5 and 6 of the Authorisation Directive and Article 9 of the Framework Directive, to which these provisions refer, the allocation of spectrum used for electronic communications services and the issuing of general authorisations or individual rights of use of such radio frequencies by 'competent national authorities' must be based on objective, transparent, non-discriminatory and proportionate criteria. The concept of competent national authorities is broader than that of a national regulatory authority⁸⁷; we therefore refer throughout this report, whenever appropriate, to *Spectrum Management Authorities (SMAs)*.

Where it is necessary to grant individual rights of use, such rights should, under Article 7 of the Authorisation Directive, be granted upon request. A selection process is only allowed where a Member State considers that the number of rights has to be limited. Such a limitation can only be implemented subject to certain conditions and procedures, such as consultation of all interested parties, the publication of any decisions (together with the reasons for the decisions), and the review, at reasonable intervals, of the limitation. Where an EU Member State concludes that further rights of use for radio frequencies can be granted, however, it must publish that conclusion and invite applications for such rights.

⁸⁷ Some electronic communications NRAs do not have competence over spectrum. In some Member States, a ministry has responsibility for spectrum management.

Under Article 5(3) of the Authorisation Directive, SMA Decisions on rights of use must be taken and made public as soon as possible after receipt of the complete application by the NRA.

The amendments of 2009

The Framework Directive was amended in 2009 to make the spectrum assignment process more efficient. Since 2009, Article 5(6) of the Authorisation Directive directs EU Member States to avoid spectrum hoarding. Member States may set out strict deadlines for the effective exploitation of rights of use by the holder and may apply penalties, including the withdrawal of the rights of use in case of non-compliance with the deadlines⁸⁸, under the enforcement procedure referred to in Article 10 of the Authorisation Directive.

At the same time, the Authorisation Directive encourages spectrum liberalisation and trading. Article 9(b) of the Framework Directive (which was inserted in 2009) requires Member States to ensure⁸⁹ that undertakings may transfer⁹⁰ or lease⁹¹ individual rights of use of radio frequencies to other undertakings in accordance with applicable conditions and national procedures in bands specified by the Commission. Member States may also permit the transfer of other frequencies outside the bands specified by the Commission. In practice, the trading of individual licences or rights of use in the bands required for wireless broadband requires prior notification and approval by the competent national authorities.

Under Article 8(a)(3) of the Framework Directive (which was also inserted in 2009), the Commission *“may submit legislative proposals to the European Parliament and the Council for establishing multiannual radio spectrum policy programmes. Such programmes shall set out the policy orientations and objectives for the strategic planning and harmonisation of the use of radio spectrum”*. The first *Radio Spectrum*

⁸⁸ “However, in order to enforce a “use it or lose it” licence condition, efficient episodic utilisation needs to be distinguished from authentic under-use or over-provisioning. (...) In addition, a nationwide frequency assignment might also make the assessment whether the frequencies are being used or not more difficult. There are examples in Germany where assignees with a nationwide frequency assignment have been using the spectrum only in a few big cities. For these reasons, it could be questioned whether the problem of anticompetitive hoarding can be solved by “use it or lose it”-regimes. (...) There are also a number of examples where spectrum usage rights holders have had to give up those rights because the spectrum was not being used. However, in some Member States, use-it-or-lose-it provisions tend not to be imposed any longer as they are considered potentially difficult to enforce” ERG/RSPG (2009), ERG-RSPG Report on radio spectrum competition issues – ERG-RSPG Report on the management of radio spectrum in order to avoid anticompetitive hoarding, June 2009, p. 31 (http://rspg-spectrum.eu/wp-content/uploads/2013/05/rspg09_278_erg_rspg_report_on_radio_spectrum_competition_issues_0906041.pdf).

⁸⁹ There is an exception where the individual right of use was initially obtained free of charge, and the provision does not apply to spectrum allocated for broadcasting.

⁹⁰ A survey of the European Conference of Postal and Telecommunications Administrations (CEPT), across Europe, indicated that, of the 22 countries that responded, only four declared that spectrum trading is not allowed. CEPT (2011), Description of Practices relative to Trading of Spectrum Rights of Use, ECC Report 169, Paris, May 2011, p. 9.

⁹¹ *Ibid.* The leasing of spectrum usage rights was permitted in only nine of the countries surveyed.

Policy Programme (RSPP) was proposed on 20 September 2010 by the Commission and adopted in March 2012 by the co-legislators. The RSPP requires Member States, in cooperation with the Commission, to foster, where appropriate, the collective use and shared use of spectrum.⁹² The shared use of spectrum refers to situations in which a number of independent users and/or devices are allowed to access the same range of frequencies under certain conditions (see also Section 2.2.1.7.3). Stakeholders are increasingly turning to emerging sharing possibilities to meet growing demands for wireless connectivity. Flexibility can be achieved in particular through increasing market-based solutions to repurpose spectrum such as tradability and leasing of spectrum, as well as shared access to spectrum such as using white spaces, spectrum pooling, and infrastructure sharing. The RSPP has established a spectrum inventory to identify spectrum-sharing opportunities. It should be noted that although sharing is not specifically mentioned in the Authorisation Directive, none of its provisions restricts the possibility by competent authorities to amend spectrum rights of use to allow shared use. On the contrary, Article 9 of the Framework Directive requires Member States to ensure “*that all types of technology used for electronic communications services may be used in the radio frequency bands, declared available for electronic communications services in their National Frequency Allocation Plan*”. Restrictions are only allowed where necessary to:

- avoid harmful interference;
- protect public health against electromagnetic fields;
- ensure technical quality of service;
- ensure maximisation of radio frequency sharing;
- safeguard efficient use of spectrum; or
- ensure the fulfilment of a general interest objective.

Member States must also “*ensure that all types of electronic communications services may be provided in the radio frequency bands, declared available for electronic communications services in their National Frequency Allocation Plan*”. Member States may, however, provide for proportionate and non-discriminatory restrictions to the types of electronic communications services to be provided, including, where necessary, to fulfil a requirement under the ITU Radio Regulations.

A measure which prohibits the provision of any other electronic communications service in a specific band may only be implemented where justified by the need to protect safety of life services. Member States may, exceptionally, also extend such a measure in order to fulfil other general interest objectives as defined by Member States in

⁹² Art. 4(1) RSPP Decision.

accordance with Community law. Member States must regularly review the necessity of the restrictions and must make the results of these reviews public.

A significant obstacle to spectrum sharing may however result from uncertainties as regards the application of national and/or EU competition law to sharing agreements entered into by competitors or potential competitors⁹³ concerning active infrastructure such as the radio access network that connects base-stations to customers' handsets.⁹⁴ Some national regulators have issued guidelines on the issue.⁹⁵

2.2.3 Implementation of key framework provisions in relation to access to spectrum

In this section, we review the current implementation by the Member States of the RFEC provisions relating to:

- spectrum auctions under Article 7(3) and (4) AuD;
- spectrum trading under Article 9(b) FWD⁹⁶;
- spectrum fees under Article 13 AuD (e.g. administrative incentive pricing); and
- spectrum sharing under Article 9(b) FWD⁹⁷ and
- spectrum re-allocation under Article 9(a) FWD (typically entailing *refarming*).

Under these provisions, SMAs can shift from a command and control approach to more market based mechanisms. In several Member States, spectrum user rights have been liberalised, and market mechanisms have been used as innovative spectrum management tools. These tools are mainly in the hands of the national Spectrum Management Authorities (SMAs).

⁹³ For example in Germany, shared use of active wireless infrastructures and spectrum resources “requires an examination by the Bundesnetzagentur of the individual case and, where appropriate, by the anti-trust authorities”. BNetzA (2010), Shared use of wireless infrastructures and spectrum resources, published in the Bundesnetzagentur Official Gazette of 11 August 2010, No 15/2010, Communication 485/2010, p.3 (http://www.bundesnetzagentur.de/SharedDocs/Downloads/EN/BNetzA/Areas/Telecommunications/TelecomRegulation/FrequencyManagement/InfrastructureSharing/InfrastructureSharingThesispaperpdf.pdf?__blob=publicationFile).

⁹⁴ At the moment, there are in practice only two infrastructure owner/operator groupings in the UK, EE/H3G and Vodafone/ Telefonica. This was one of the main obstacles to the merger between H3G and Telefonica, which the Commission has blocked. See Commission Press Release of 11 May 2016, “Commission prohibits Hutchison’s proposed acquisition of Telefónica UK”.

⁹⁵ See for instance BIPT, Communication of 17 January 2012 Containing Guidelines For Infrastructure Sharing (http://www.bipt.be/public/files/en/680/3666_en_02_tech_infra_sharing_eng_final.pdf).

⁹⁶ Including Art. 6(8) RSPP Decision, which requires Member States to ‘allow the transfer or leasing of rights of use of spectrum in the harmonised bands 790-862 MHz, 880-915 MHz, 925-960 MHz, 1 710-1 785 MHz, 1 805-1 880 MHz, 1 900-1 980 MHz, 2 010-2 025 MHz, 2 110-2 170 MHz, 2,5-2,69 GHz, and 3,4-3,8 GHz’.

⁹⁷ Including Art. 4(5) Radio Spectrum Decision No 676/2002/EC.

Our approach throughout this section is to focus on the *observable, measurable effects* of the implementation in the Member States, given that the implementation details themselves in terms of national law and regulation are hugely diverse.

Our assessment of the degree to which these measurable effects are consistent with achieving the objectives of the regulatory framework for electronic communications in line with the better regulation evaluation criteria appears in Section 2.2.5.

2.2.3.1 Availability of dedicated bands for ECS

Under Article 8(a) of the Framework Directive Member States must promote the coordination of radio spectrum policy approaches in the European Community and, where appropriate, harmonised conditions with regard to the availability and efficient use of radio spectrum necessary for the establishment and functioning of the internal market in electronic communications. Our focus here is on spectrum availability and assignment for Electronic Communication Services (ECS) and licence exempt spectrum. For ECS, the amount of spectrum assigned for WAPECS use (i.e. available for commercial mobile services) is crucial, especially the amount of paired spectrum below 1 GHz in frequency (representing high value spectrum that network operators prefer for FDD mobile services). Spectrum above 1 GHz in frequency can still be valuable for mobile services, but is less attractive than sub-1 GHz spectrum in terms of cost-effectiveness for achieving mobile coverage.

The differences among European Member States are substantial. Most European Member States assigned around 130 MHz of paired spectrum below 1 GHz as of the end of 2015. Malta, Cyprus and Bulgaria are the three Member States in which less than 70 MHz below 1 GHz have been assigned for WAPECS use. A majority of Member States have assigned more than 400 MHz of WAPECS spectrum above 1 GHz, but again differences from one Member State to the next are substantial.

Table 4: Assigned paired WAPECS spectrum (in MHz), EU28, 2015 (at year end)

< 1 GHz		> 1 GHz		Total	
	2015		2015		2015
DE	189,6	DE	523,4	DE	713
FR	189,6	AT	485	AT	615
CZ	137,2	NL	483,8	NL	613,8
IE	135	DK	475,6	FR	310,6
AT	130	PL	475,2	DK	605,2
GR	130	FI	472	PL	604,8
NL	130	IT	470	FI	600,8
SE	130	SE	463,8	IT	599,6
SI	130	SI	463,8	SE	593,8
SK	130	SK	463,8	SI	593,8
UK	130	UK	463,8	SK	593,8
DK	129,6	EE	459,6	UK	593,8
ES	129,6	LT	457,6	LT	587,2
HU	129,6	GR	455	EE	585,6
IT	129,6	ES	438	GR	585
LT	129,6	LV	423,8	ES	567,6
PL	129,6	FR	421	LV	552,6
FI	128,8	LU	420	LU	547,6
LV	128,8	HU	414,6	HU	544,2
BE	128,4	EU average	406,73	EU average	533,51
HR	127,6	EO	393,8	RO	513,8
LU	127,6	PT	380	CZ	499
EU average	126,78	CZ	361,8	PT	497,6
EE	126	BE	354,6	BE	483
RO	120	IE	275	IE	410
PT	117,6	HR	254,6	HR	382,2
MT	70	CY	238,8	CY	307,6
CY	68,8	MT	225	MT	295
BG	67,2	BG	175	BG	242,2
		Coefficient of variation		Coefficient of variation	
		0.11		0.18	
				0.16	

Source: WIK Consult/Cullen International.

2.2.3.2 Assignment of spectrum to network operators and assignment procedures

Article 5(2), second subparagraph of the Authorisation Directive provides high-level principles for awards and conditions of use for all uses of spectrum, including a presumption of “open, objective, transparent, non-discriminatory and proportionate” award procedures, but leaves a broad margin of discretion to national Spectrum Management Agencies (SMAs) to detail the specification of the assignment conditions.

Of interest here is the degree to which award procedures might impact efficient spectrum use, either as a result of design flaws or as a result of lack of consistency among the Member States.

In this section, we report on assignment conditions and consider what might impact the efficient usage of spectrum, competition dynamics and the market structure of mobile markets. Indicators of interest include:

- the date of assignment for 800 MHz and 2.6 GHz spectrum;
- the duration of spectrum licenses (licence term) for 800 MHz and 2.6 GHz;
- the auction format used (SMRA, CCA, ...) for the assignment of spectrum licenses in 800 MHz and 2.6 GHz WAPECS bands (for the EU 17 from 2007 through 2015);
- the use of spectrum caps in auctions of spectrum licenses;
- the average price per MHz/pop (a normalised measure) for spectrum;
- provisions relating to flexibility of use;
- coverage obligations;
- MVNO and other access obligations imposed through the award procedure;
- permission and actual use of trades or other means of reallocating spectrum; and
- the method of determining annual spectrum usage fees.

2.2.3.2.1 Date of assignment for 800 MHz and 2.6 GHz spectrum

In 2010, the Commission adopted Decision 2010/267/EU laying down harmonised technical conditions for the use of the 800 MHz frequency band. This Decision did not itself require Member States to make available the 800 MHz band for electronic communication services. This obligation was set in Article 6(4) of the RSPD Decision which requires Member States to carry out the authorisation process in order to allow the use of the 800 MHz band for electronic communications services. However, the Commission could grant specific derogations until 31 December 2015 for Member States in which exceptional national or local circumstances or cross-border frequency coordination problems would prevent the availability of the band.

Decision 2008/477/EC on the harmonisation of the 2500 - 2690 MHz frequency band for terrestrial systems capable of providing electronic communications services requested Member States to designate and subsequently make available, on a non-exclusive basis, the 2.6 GHz band for terrestrial systems capable of providing electronic communications services, no later than six months after its entry into force. However, Member States were allowed to request transitional periods that may include radio spectrum sharing arrangements.

Delays in assignment and resulting time lags between different Member States may impede the investment in and roll-out of mobile networks; moreover, cross-border aspects can play an important role, especially when time lags are substantial. Harmful radio interference knows nothing of lines on a map. Network operators in Member States that assign suitable spectrum promptly could be hampered in their efforts to deploy by cross-border interference from neighbouring Member States that were slow to assign spectrum.

Table 5 demonstrates that 800 MHz WAPECS spectrum was assigned promptly in some Member States; however, many other Member States encountered very substantial delays. The observation for 2.6 GHz spectrum is quite similar. Indeed, the process was still ongoing in 2016 in Bulgaria, Cyprus, Malta, and (for 2.6 GHz only) in Croatia and Ireland. Delays in assignment were a general problem in most Member States (not all), but they were much worse in some Member States than in others.

Table 5: Date of assignment (license award year) of spectrum licenses in 800 MHz and 2.6 GHz WAPECS bands, EU 28, 2007-15

Year of Assignment(s)	800 MHz Countries	2.6 GHz Countries
2008		SE
2009		FI
2010	DE	AT, DK, DE, EE, NL
2011	FR, IT, PT, ES, SE	BE, FR, IT, PT, ES
2012	DK, IE, HR, LU, NL	LV, LT, LU
2013	AT, BE, CZ, EE, FI, HR, LV, LT, SK, UK	CZ, SK, UK
2014	GR, HU, RO, SI	EL, HU, RO, SK, SI
2015	PL	LT, PL
2016	CY	CY
Pending	BG, MT	BG, HR, IE, MT

Source: Cullen International.

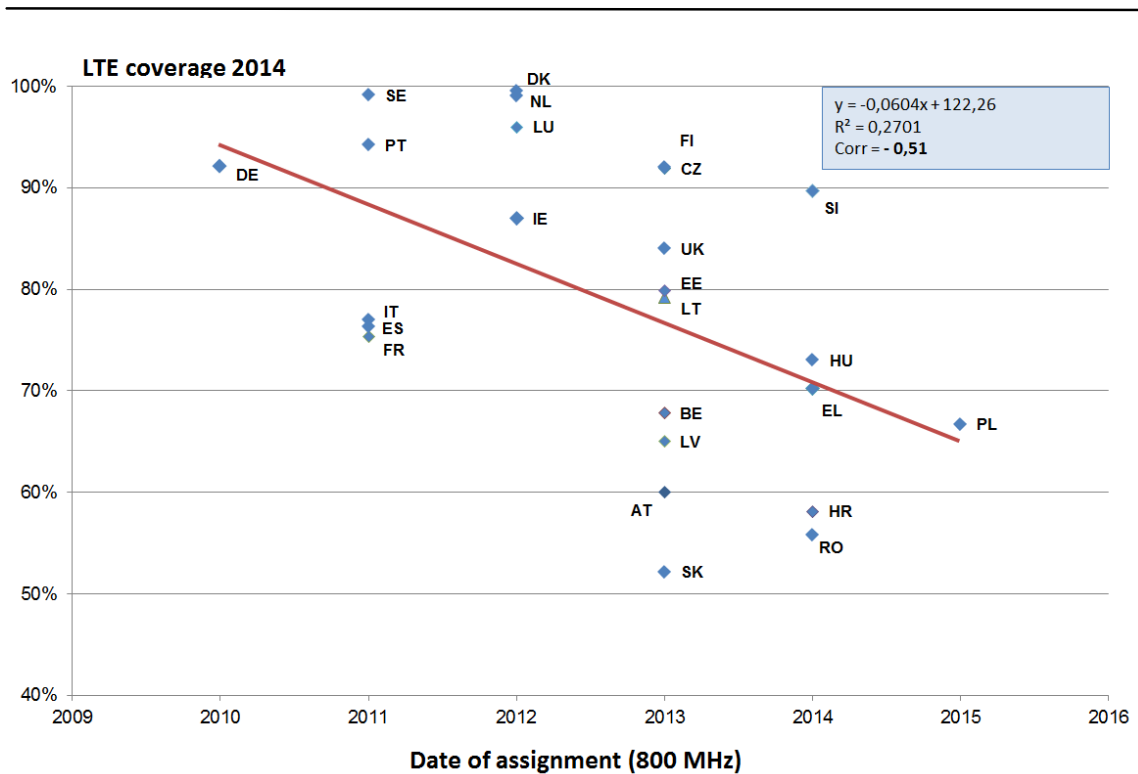
Note: LT, SK, HR are listed more than once because there have been several subsequent assignment procedures

In some Member States, delays were surely justified (e.g. due to cross-border interference from outside the EU), but not in all. Process problems and auction design flaws appear to have played a role in delays in some Member States.

Not surprisingly, actual LTE coverage in the European Member States is highly correlated with the year in which 800 MHz spectrum was initially assigned to WAPECS use (see Figure 8). In other words, LTE availability is much better in Member States which achieved timely assignment. This finding is important, and is statistically

significant at the 99% level. The natural inference is that it was not possible for LTE to achieve widespread deployment until suitable spectrum was assigned; moreover, it was rolled out more rapidly where suitable spectrum was available.

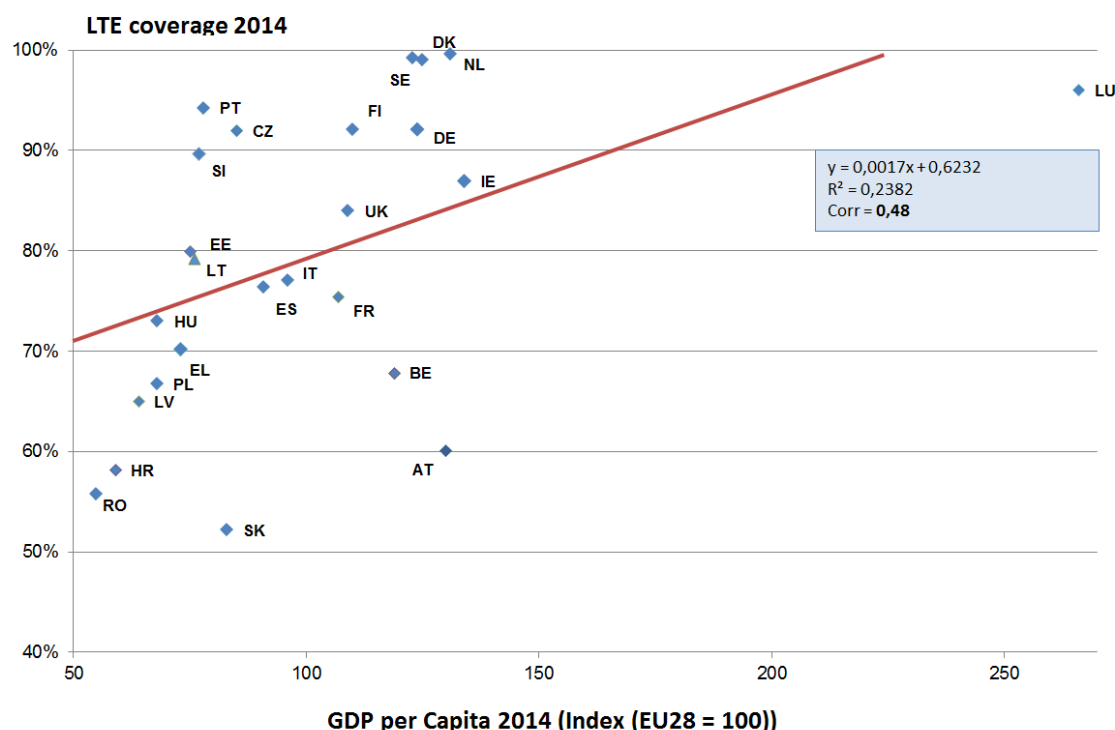
Figure 8: LTE coverage versus the year of assignment of 800 MHz WAPECS spectrum, EU Member States, 2014



Source: WIK Consult/Cullen International.

Other factors might also be important. Figure 9 shows a positive correlation between GDP per capita and LTE coverage. The relationship is statistically significant at the 95% level. Countries with high GDP per capita will tend to have strong income per capita and high willingness to pay for high quality services, so again this is not surprising. The natural inference is that network operators rolled out LTE services in Member States where consumers were able to pay for them. Nonetheless, the effect appears to be dominated by the impact of the year of availability of 800 MHz spectrum. Certain countries such as Belgium and Austria that have a high GDP per capita nonetheless have low LTE coverage, presumably due to late assignment of 800 MHz spectrum as indicated in Figure 8.

Figure 9: LTE coverage versus GDP per capita, EU Member States (EU28=100), 2014



Source: WIK Consult/Cullen International/Eurostat.

The launch of LTE-1800 networks provided network operators with an alternative way to roll out LTE network coverage; however, due to its propagation characteristics, the 800 MHz is far more cost-effective than 1800 MHz spectrum for establishing coverage in low density areas. Thus, the timely availability of 800 MHz had a stronger positive impact than 1800 MHz spectrum on the availability of LTE among the Member States.

2.2.3.2.2 Duration of spectrum licenses (licence term) for 800 MHz and 2.6 GHz

Under Article 5(2) AuD, where Member States grant rights of use for a limited period of time, the duration shall be appropriate for the service concerned in view of the objective pursued taking due account of the need to allow for an appropriate period for investment amortisation. To provide reasonable incentives for an investment of billions

of Euro network, operators must have a long enough time in which they can generate revenue to cover (amortise) network investment costs.⁹⁸

In our interviews, many ECS network operators argued that licence duration for commercial (WAPECS) spectrum should be not less than 20 years. Some ECS operators asked for 25 year licence terms, or even for indefinite licence terms as are now implemented in the UK.

The choice of the ideal licence duration involves complex trade-offs. This is not solely or even primarily about the amortisation period of the infrastructure equipment used (which might for that matter perhaps be redeployed or sold at the end of the licence duration). The licence has the character of a lease; thus, a longer duration implies a higher total price, and also means that any refarming costs incurred at the end are effectively spread over a longer useful lifetime. Conversely, a shorter licence duration provides greater flexibility to SMAs in terms of the ability to respond to changing circumstances.⁹⁹

Table 6 demonstrates that licence terms for 800 MHz WAPECS spectrum user rights which were assigned to MNOs differ greatly among the Member States, ranging from 12 years (Croatia) to indefinite (Estonia,¹⁰⁰ UK). Many Member States have set a licence term of roughly 15 years (11 Member States).

⁹⁸ Under Art. 5(2) Authorisation Directive, “(w)here Member States grant rights of use [for radio frequencies] for a limited period of time, the duration shall be appropriate for the service concerned in view of the objective pursued taking due account of the need to allow for an appropriate period for investment amortisation.”

⁹⁹ If secondary markets were fully effective, SMAs might not need this flexibility. Given the relative lack of effectiveness of spectrum secondary market provisions (see Section 2.2.3.2.5), flexibility is helpful.

¹⁰⁰ In Estonia, spectrum licences are issued for one year at a time, but are subject to semi-automatic renewal every year without limitation once the fixed annual usage fee has been paid.

Table 6: Duration of 800 MHz spectrum licences as of February 2016

Country	Licence duration		Country	Licence duration
AT	15		IT	17
BE	20		LT	15
CZ	15		LU	15
DE	15		LV	20
DK	22		NL	18
EE	1 ¹⁰¹		PL	15
ES	16		PT	15
FI	20		RO	15
FR	21		SE	24
GR	16		SI	15
HR	12/11 ¹⁰²		SK	15
HU	20		UK	Indefinite
IE	15			

Source: WIK Consult/Cullen International.

2.2.3.2.3 Auction format used for the assignment of spectrum licenses

Article 7(4) AuD allows Member States to assign spectrum licences either through competitive or comparative selection procedures. Nowadays, spectrum auctions (competitive selection procedures) are the most common selection mechanism employed for the assignment of ECS spectrum in the European Union. At the same time, the Directives restrict neither the specific auction format nor the specific elements of the auction design applied by SMAs beyond the requirement that the selection criteria must be objective, transparent, non-discriminatory and proportionate. As a consequence, auction formats and detailed parameters differ significantly across the European Member States.

The most prominent spectrum auction formats are (1) the so-called traditional *Simultaneous Multiple Round Auction (SMRA)*, and (2) the *Combinatorial Clock Auction (CCA)*, the latter sometimes being used where it is necessary to allow for the assignment of flexible packages of predefined spectrum blocks. In principle, each format has its strengths and weaknesses. The RSPG has published a consultation

¹⁰¹ Licences in EE are annually renewable without limit upon payment of an administrative charge.

¹⁰² In Croatia, licences for 800 MHz spectrum were issued in two rounds. During the first round, two blocks of 2x10 MHz were awarded in 2012 (12 years of licence duration). Subsequently, the remaining unsold spectrum was awarded in 2013 as two blocks of 2x5 MHz (11 years of licence duration). All of these licences are set to expire in 2024.

report on the efficient award procedures with the aim to identify best practice approaches.¹⁰³

Table 7 indicates the auction formats which were used within the Member States for the assignment of 800 MHz and 2.6 GHz spectrum.

Table 7: Auction format used for the assignment of spectrum licenses in the 800 MHz and 2.6 GHz WAPECS bands, EU 17, 2007-15

Country	Award Method 800 MHz Countries	Award Method 2.6 MHz Countries
Auction - Combinatorial Clock Format	AT, DK, IE, NL, RO, SK, SI, UK	AT, DK, NL, RO, SK, SI, UK
Auction - Traditional Simultaneous Multiple Round Format	BE, CZ, FI, DE, EE, GR, IT, LV, LT, PL, PT, ES, SE	BE, CZ, FI, DE, GR, IT, LV, LT, PL, PT, ES, SK, SE
Hybrid (Combination of Auction and Beauty Contest)	ES, FR	FR
Beauty Contest	HU	HU
Granted	LU	LU

Source: Cullen International.

The traditional Simultaneous Multiple Round Format was chosen by 13 Member States both for 800 MHz and 2.6 GHz, and is the most common auction format. The CCA format was considered as appropriate in eight Member States for the 800 MHz band. A beauty contest was used only in Hungary. A hybrid format was used in France and in Spain with regard to 800 MHz.

The appropriateness of the overall auction design depends on award method, but also on the whole set of detailed rules addressing for example the reserve price, possible reservation of spectrum for newcomers, and transparency rules. These procedures differ substantially in specific rules and timings.

In our interviews, a range of credible concerns were raised regarding specific rules in assignment procedures in recent spectrum auctions in European Member States. High reserve prices seem to be by far the issue that is most criticised. Auction prices should not be higher than the market price. Inappropriately high reserve prices undermine the effectiveness of the auction as a price discovery process, and can have a negative

¹⁰³ RSPG (2015), Report on Efficient Awards and Efficient Use of Spectrum, Draft for public consultation: Brussels, RSPG15-619, 21 October 2015.

effect on investment and network roll-out and finally on the provision of services. Interviewees claimed that high reserve prices in for example France, Greece and Hungary turned the auction into a take-it-or-leave-it process. In France, the 700 MHz reserve price was set 3 times higher than the final 700 MHz auction price in Germany.

Interviewees identified a number of apparent specific auction design flaws in individual auctions. These concerns appear to be valid.

- The spectrum auction in Poland was criticised by many respondents for a number of reasons. Despite a significant time delay, the lack of a reasonable pre-qualification test was mentioned as having been problematic, as well as the rule that final bids were not binding.
- A mobile network operator highlighted that the transparency rule in the Austrian 800 MHz auction was changed at high price levels during the auction. This might indicate that the initial auction rules were not set appropriately.

Several MNO interviewees expressed concerns regarding payment modalities. They argued that spectrum should not be paid for until it can actually be used (with the possible exception of the need to finance the cost of clearing the band) in order to generate incentives for Member States not to unnecessarily delay the release of new spectrum.

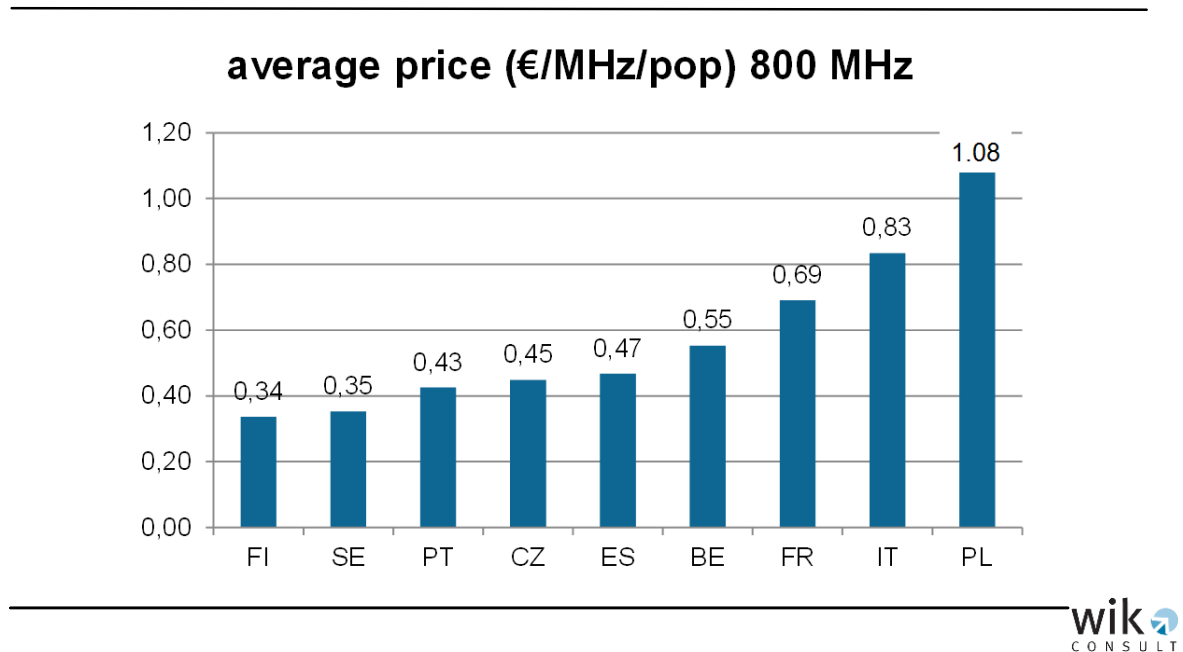
As is well-known among specialists in spectrum auction design, the details matter. Auction specialists are needed as advisors to support good auction design. Interviewees claimed, however, that the SMA in some countries simply adopted auction rules from other countries with very different circumstances, or that they simply modified rules of a format that had been appropriate when initially adopted without foreseeing the implications on bidding behaviour or on the potential results of the auction.

Average auction prices vary greatly among the Member States. Average auction prices for a selection of relevant Member States (expressed in € / MHz / pop for 800 MHz spectrum) varied between € 0.34 in Finland and € 1.08 in Poland (see Figure 10). Since € / MHz / pop is a normalised measure, it is natural to speculate that these differences reflect specificities of the particular auction process used; however, an alternative explanation might be that they reflect other differences among the Member States, for instance in disposable income and corresponding willingness to pay for mobile service.

Without a fully detailed investigation of the auctions in question, it would be inappropriate to render a definitive judgment; however, we note that many MNO stakeholders (see Section 2.2.3.2.3) criticised the Polish auction for a lack of bidder pre-qualification, and for allowing the withdrawal of bids after they have been made. The French auctions were criticised for an excessive reserve price (three times higher than that in Germany). Poland, the country with the highest price / MHz / pop in this group, is

not a Member State that is characterised by high GDP per capita. In both cases, flawed process might well be the main explanation for inflated auction prices.

Figure 10: Average auction price (€ / MHz / pop) for 800 MHz spectrum



Source: WIK Consult/Cullen International.

2.2.3.2.4 Spectrum caps in spectrum auctions

Article 5(6) of the Authorisation Directive requires competent national authorities, *inter alia*, to ensure that competition is not distorted by any accumulation of rights of use of radio frequencies. In order to prevent some network operators from receiving spectrum user rights that are too extensive (with a risk of undermining competition), SMAs often impose spectrum caps on the total amount of spectrum any single operator can hold either within a band or across different bands. This practice is especially common for the valuable bands below 1 GHz, or for the somewhat less valuable bands below 3 GHz.

Most MNO interviewees acknowledged the appropriateness of this practice in general.

Among the 17 EU Member States in our sample, all have imposed spectrum caps for ECS spectrum. Some apply spectrum caps only during an award procedure, in which case they may not be relevant to later spectrum trading. Others apply permanent rules that are applicable to any subsequent spectrum trading. Our assessment of the spectrum caps imposed revealed a quite diverse picture across the EU17 Member States. For example, Table 8 and Table 9 show the spectrum caps applied in Slovenia (4 MNOs (2015), 4 MNOs (2007)) and in Austria (3 MNOs (2015), 4 MNO (2007)), respectively. In both Member States, a total cap for 800 MHz and 900 MHz was

imposed; however, the cap was 2x30 MHz in Slovenia, but 2x35 MHz in Austria. For individual bands in these ranges, Slovenia imposed a cap of 2x15 MHz for 900 MHz, while Austria imposed a much less strict 2x30 MHz cap. Slovenia did not impose a single cap for 800 MHz spectrum; by contrast, Austria imposed a 2x20 MHz cap. Austria imposed an additional collective cap of 2x70 MHz for 800 MHz, 900 MHz and 1800 MHz spectrum; Slovenia imposed an additional collective cap of 2x105 MHz for 800 MHz, 900 MHz, 1800 MHz, 2 GHz and 2.6. Finally, a single cap for 1800 MHz spectrum was applied in Slovenia, but not in Austria.

Table 8: Permanent spectrum caps imposed in Slovenia

Spectrum bands	Spectrum caps
800 MHz and 900 MHz	2x30 MHz
900 MHz	2x15 MHz
1800 MHz	2x30 MHz
800 MHz, 900 MHz, 1,8 GHz, 2 GHz and 2,6 GHz (including the existing licences in the 2 GHz band)	2x105 MHz

Source: Cullen International.

Table 9: Permanent spectrum caps imposed in Austria

Spectrum bands	Spectrum caps
800 MHz	2x20 MHz
900 MHz	2x30 MHz
800 MHz and 900 MHz	2x35 MHz
1,8 GHz	No cap
800 MHz, 900 MHz and 1,8 GHz	2x70 MHz

Source: Cullen International.

In the UK, a specific spectrum cap for the 800 MHz and 2,6 GHz auction was applied: 2x27,5 MHz was imposed on spectrum below 1 GHz, and a total cap of 2x105 MHz (or 2x107,5 if the bidder does not have any unpaired 2,6 GHz spectrum) and 2 GHz unpaired spectrum not included. Caps applied on the overall amount of mobile spectrum and on the amount of sub-1 GHz spectrum (spectrum rights expiring before 2 October 2015 are not accounted for in the calculation of existing spectrum holdings).

Caps on spectrum below 1 GHz have greater import than caps on less valuable bands. Some Member States (e.g. Belgium, Finland, the Netherlands, Sweden and Slovakia) have not imposed such caps, while other national SMAs imposed a cap which varies between 2x10 MHz (CZ) and 2x35 MHz (AT). Spectrum caps such as those imposed in Austria (Table 9) and Slovenia (Table 8) serve only to prevent excessive holdings on

the part of specific operators; in and of themselves, however, they do not determine the market structure.

These differences do not necessarily represent a defect. The caps would need to be assessed against the specific competition threats that they were presumably intended to address, which are highly case-specific.

2.2.3.2.5 Flexibility of use

Article 8(1) second paragraph of the Framework Directive requires Member States “*to take the utmost account of the desirability of making regulations technologically neutral*”, “unless otherwise provided for in Article 9 [of the Framework Directive] regarding radio frequencies”. Article 9(3) of this Directive sets forth the principle that “*all types of technology used for electronic communications services may be used in the radio frequency bands, declared available for electronic communications services*” except where restrictions are necessary among other to avoid harmful interference. In addition, Article 9(4) of the Framework Directive imposes upon Member States the obligation to “*ensure that all types of electronic communications services may be provided in the radio frequency bands declared available for electronic communications services*”. Also in this regard Member States may foresee exceptions, for example in order to avoid an inefficient use of radio frequencies or in order to promote cultural and linguistic diversity and media pluralism.

The European Commission established the Wireless Access Platform for Electronic Communications Services (WAPECS)¹⁰⁴ to enable operators to choose the most efficient technology for the provision of services in the main mobile bands. In doing so, it has succeeded in defining ‘least restrictive technical conditions’ applicable to multiple technologies. While the ECS spectrum was initially restricted to be used only by specific technology standards (for example GSM in the 900 MHz band), the European Commission subsequently began to promote the use of ECS spectrum in a more flexible way. The WAPECS initiative was the starting point for encouraging that ECS spectrum be assigned in a technology neutral manner. Thus, 800 MHz and 2.6 GHz has been assigned without any specific technology prescriptions.

The same principles of technological neutrality were subsequently applied to spectrum that had previously been assigned. This allowed MNOs to use the 1800 MHz spectrum (which initially was restricted to GSM) to provide LTE 1800 MHz services. In some cases, SMAs had to deal with competitive distortions in enabling LTE 1800 MHz due to a highly asymmetric distribution of spectrum user rights in the 1800 MHz band.

¹⁰⁴ <https://ec.europa.eu/digital-single-market/en/wapecs-flexible-approach-spectrum-use>.

In France, for instance, ARCEP concluded that there was no reason, among those listed in CPCE Article L42,¹⁰⁵ which made it “necessary” for the terms of Bouygues Telecom’s 1800 MHz band licence to continue to restrict its use of the band to GSM technology – provided that, in light of current spectrum assignments, a more balanced allocation of the 1800 MHz band be performed, in the name of “measures to ensure equality between operators and the conditions for effective competition”¹⁰⁶. In addition, by virtue of the provisions of Article 59 of the Order of 24 August 2011, Bouygues Telecom was obliged to hand back additional spectrum in the 1800 MHz band by 25 May 2016, such that it would own only a duplex block of 20 MHz¹⁰⁷. The early lifting of the restriction that Bouygues Telecom requested also required the network operator to pass through an intermediate stage – whose timetable, which is set by this decision, would vary depending on the area in question – during which it would have only a duplex block of 21.6 MHz.

Today, GSM, UMTS and LTE technologies can be used in the 900 MHz and 1800 MHz bands. Decisions on flexibility have been taken by SMAs in most Member States between 2009 and 2014, with only a few exceptions; however, enabling flexible use of these bands was a slow process. In Germany, for instance, licences that were technology specific when initially granted are not automatically made technology neutral, but the licence holder can request the change. In France, UMTS applications have been possible since the ARCEP decision of 27 February 2008. In Slovakia, licences became usable for LTE on 4 January 2016.

Technological neutrality enabled operators to deploy UMTS-900 and LTE-1800. Table 10 indicates Member States in our EU17 sample in which mobile operators made use of this right.

Table 10: Use of UMTS-900 and LTE-1800 enabled by flexibility

UMTS 900	DE (E-Plus at 25 cities), FR, HU (Vodafone), IT, NL, PL (P4 (Play) Aero2), SE (Hi3G), UK (O2)
LTE-1800	AT (Hutchison Drei Austria), DE (Telekom Deutschland in cities), ES (Orange, Yoigo and Vodafone launched 4G services in this band in July 2013), FR (Bouygues), IT, NL, PL (Centernet: Mobyland); PT (all mobile operators), SE (Tele2 in April 2013 in Stockholm, Göteborg and Malmö), SI, SK, UK

Source: Cullen International.

¹⁰⁵ Code des Postes et des Communications Electroniques (CPCE), partie législative, 26/07/2013 (<http://www.arcep.fr/fileadmin/reprise/textes/lois/cpce-legis.pdf>).

¹⁰⁶ <http://lte-depot.blogspot.de/2013/03/4g-refarming-1800-mhz-france.html>

¹⁰⁷ ARCEP, Décision n° 2013-0363 de l’Autorité de régulation des communications électroniques et des postes en date du 14 mars 2013 relative à la demande de la société Bouygues Telecom de réexamen des restrictions technologiques de son autorisation d’utilisation de fréquences dans la bande 1800 MHz au titre du II de l’article 59 de l’ordonnance n°2011-1012 du 24 août 2011 (http://www.arcep.fr/uploads/tx_gsavis/13-0363.pdf).

Table 10 also demonstrates that refarming possibilities were used extensively. The launch of LTE-1800 enabled the operators to provide LTE services in Member States where 800 MHz WAPECS spectrum was not yet available, or prior to the time when end-user devices could support LTE-800. Thus, the timely implementation of refarming decisions can be important.

2.2.3.2.6 Coverage obligations

SMAAs may attach conditions to rights of use frequencies, *inter alia*, an “obligation to provide a service or to use a type of technology for which the rights of use for the frequency has been granted, including, where appropriate, coverage and quality requirements” (condition B.1 of the Annex to the Authorisation Directive).

In our EU-17 sample, all national SMAAs set coverage requirements when they award spectrum below 1 GHz in order to ensure that services based on the spectrum will be made available to as many of their citizens or residents as possible, often with a goal of service coverage that is substantially nationwide.

The motivation for ensuring coverage is two-fold. On the one hand, SMAAs have the ubiquitous provision of mobile services in mind. In some remote low-density rural areas, mobile broadband internet access may represent the most practical prospect for providing ubiquitous broadband coverage.¹⁰⁸ Due to the economic unattractiveness of providing service in low-density or otherwise difficult areas from an operator’s point of view, obligations tied to the right of frequency usage might be a reasonable way to ensure coverage (an implicit ‘universal service obligation’). Furthermore, where SMAAs intend to establish comprehensive regional competition, and to prevent *cherry picking* (where one or more operators deploy only to the most profitable areas), it might be reasonable for all spectrum users to face a similar ongoing coverage obligation.

There are also some Member States that include railways and roads in their coverage obligations. In Germany, for instance, 700 MHz spectrum rights holders must cover all main traffic routes (federal highways and ICE railway routes).¹⁰⁹ Particular care may be needed going forward to ensure seamless coverage when trains or connected cars cross Member State borders.

Policymakers may be drawn to the use of coverage obligations to the extent that they achieve societal needs without burdening the state’s treasury; however, it should be remembered that these obligations are not costless. Since they represent a cost to the network operator that wins the bid, they will tend to lower the bid price, thus reducing

¹⁰⁸ Satellite services represent an alternative, but they often entail higher cost, and in the case of geosynchronous satellites always entail high transit delay (270 milliseconds). See ESOA (2016), ESOA position on Digital Single Market initiatives; and Van den Ende, B. et al. (2013), Entertainment x.0 to boost Broadband Deployment, a study for the European Parliament.

¹⁰⁹ Our focus here is on use by rail passengers, for instance for communication or entertainment services while travelling. Rail *operational communications* including train control would be addressed instead by means of GSM-R.

auction revenue to the state. Furthermore, the extra costs of coverage are presumably reflected in ultimate prices to end-users, and thus reduce consumption depending on the price elasticity of demand.

For MNOs, it is important that such requirements be defined and published before the assignment process begins. Spectrum bidders can then take these requirements and the respective implementation costs into account when lodging their bids. This gives network investors the necessary planning and investment certainty.

Coverage obligations for 800 MHz among the Member States cannot be easily compared due to different percentages and the point in time at which a specific level of coverage has to be fulfilled. Sometimes, obligations can be very specific as to regional areas in which service must be provided. Moreover, the specification in technical terms can be quite specific. Table 11 provides examples of coverage obligations which have been imposed on 800 MHz spectrum in Austria, Belgium, the Czech Republic, Germany and Portugal.

Table 11: Coverage obligations attached to 800 MHz spectrum licenses in selected countries

Austria (800 MHz, 900 MHz, 1.8 GHz auction) 2013
<p>Very detailed coverage obligations and penalties, comprising about 12 pages of the tender document. The following list contains only a summary.</p> <p>Most obligations refer to outdoor coverage of percent of population.</p> <p>800 MHz</p> <ul style="list-style-type: none"> • 25% coverage with 1 Mbps/250 kbps within three years, using 800 MHz spectrum • 95% coverage with 1 Mbps/250 kbps within three years, using any band • Two annexes contain lists of 297+244 municipalities in rural areas (about 7.3% of Austrian population). The winner of the category A3 block (A1 Telekom Austria) must cover 120+60 municipalities within 18 months and 240+120 municipalities within three years. The other winners of 800 MHz spectrum (T-Mobile Austria) must cover 30+60 municipalities within 18 months and 60+120 municipalities within three years. <p>900 MHz</p> <ul style="list-style-type: none"> • 25% coverage with 12,2 kbps ("e.g. voice telephony") within 18 months, using 900 MHz • 98% coverage with 12.2 kbps ("e.g. voice telephony") within 18 months, using any band • 95% coverage with 1 Mbps/250 kbps within 18 months, using any band <p>1800 MHz</p> <ul style="list-style-type: none"> • 25% coverage with 12.2 kbps ("for voice telephony") within 18 months, using 1800 MHz spectrum • 90% coverage with 12.2 kbps ("for example voice telephony") within 18 months, using any band • 90% coverage with 1 Mbps/250 kbps within 18 months, using any band <p>The 18-month period for the 900 and 1800 MHz population coverage targets starts when the operator has a full 2x5 MHz block (for the 12,2 kbps voice service) or two full blocks (for the 1 Mbps/250 kbps broadband service).</p>
Belgium 800 MHz 2013
<p>Population covered:</p> <p><i>800 MHz operators with 900 MHz or 1800 MHz spectrum (2G operators)</i></p> <ul style="list-style-type: none"> • 30% after two years • 70% after four years • 98% after six years <p><i>800 MHz operators that are not 2G operators</i></p> <ul style="list-style-type: none"> • 30% after three years • 70% after six years • 98% after nine years <p><i>60 priority municipalities, not covered by 3G</i></p> <ul style="list-style-type: none"> • 98% of the combined population within three years • By one operator, in the 811-821/852-862 MHz bands <p>The coverage obligations can be met by using any spectrum an operator has in 800 MHz, 900 MHz, 1800 MHz and 2 and 2,6 GHz bands.</p>
Czech Republic 800 MHz 2013
<p>The Czech territory was divided in 77 areas. In each area, 95% of population must be covered. Shorter deadlines for covering the 32 rural areas than for covering the 45 urban or semi-urban areas. Coverage can be obtained using a mix of 800 MHz, 1800 MHz and 2.6 GHz spectrum.</p>

Germany 800 MHz 2010
<p>The federal states assembled lists of municipalities which were not sufficiently covered by broadband access and classified them into four different 'priority areas'.</p> <p>Operators had to start rollout in priority area 1 and were not allowed to proceed in the next priority area before 90% of households in the previous priority area had access to broadband at a minimum 1 Mbps.</p> <p>With regard to the 90% threshold, a household was also counted as covered if it had access to another (fixed or mobile) broadband access technology.</p> <p>By November 2013, licensees had fulfilled the special coverage obligation in all federal states.</p> <p>Independently from the above-mentioned coverage obligations, the licensees must also ensure that they cover 50% of households in each federal state with their own 800 MHz frequencies by 1 January 2016.</p>
France 800 MHz, 2011
<p>At national level, population coverage:</p> <ul style="list-style-type: none"> • 98% within 12 years • 99,6% within 15 years <p>At regional level (départements), population coverage:</p> <ul style="list-style-type: none"> • Standard requirement: 90% within 12 years in each region • Extra requirement that an applicant may or may not commit to: 95% within 15 years in each region <p>In the priority area defined by ARCEP, i.e. the area which is difficult to cover with spectrum above 1 GHz (i.e. with 3G in the 2 GHz band), population coverage of:</p> <ul style="list-style-type: none"> • 40% within 5 years • 90% within 10 years. <p>All coverage requirements can be met by using:</p> <ul style="list-style-type: none"> • own infrastructure • infrastructure/spectrum sharing • spectrum in other bands, e.g. in the 2,6 GHz band.
Portugal 800 MHz 2011
<p>ANACOM identified 480 communes without broadband coverage. Each MNO must cover 160 of these communes.</p> <p>Coverage must reach at least 50% and 100% of the communes within respectively max. 6 months and 1 year from ANACOM's notification of the end of the existing technical restrictions in the 800 MHz band. Coverage obligations also may be met through the use of the 900 MHz band.</p> <p>Reference speeds for the coverage obligation (May 2015).</p>

Source: Cullen International.

The substantial differences in coverage obligations seem to reflect specific national circumstances. To demonstrate this, we assess the cases of Germany and Belgium.

In Germany,¹¹⁰ there were many areas in which Broadband access with transmission rates of at least 1 Mbit/sec was not available in 2010, the year of the 800 MHz spectrum

¹¹⁰ Entscheidung der Präsidentenkammer der Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen vom 12. Oktober 2009 über die Verbindung der Vergabe von Frequenzen in den Bereichen 790 bis 862 MHz sowie 1710 bis 1725 MHz und 1805 bis 1820 MHz mit dem Verfahren zur Vergabe von Frequenzen in den Bereichen 1,8 GHz, 2 GHz und 2,6 GHz für den drahtlosen Netzzugang zum Angebot von Telekommunikationsdiensten sowie über die

assignment. The 800 MHz coverage obligations were intended to fill these gaps: An 800 MHz spectrum rights holder was obliged to cover at least 90% of the population with the cities and communities that were listed ("White Areas" with a low broadband availability) by the 16 federal states as of 1 January 2016. Insofar as broadband access (at least 1 Mbit/sec.) was available by means of other technologies, this was also taken into account. For the cities and communities provided by the federal states, BNetzA determined four Priority Clusters:

- Priority Cluster 1: Named cities and communities by the federal states with up to 5000 inhabitants.
- Priority Cluster 2. Named cities and communities by the federal states with from 5,000 to 20,000 inhabitants.
- Priority Cluster 3. Named cities and communities by the federal states with from 20,000 to 50,000 inhabitants.
- Priority Cluster 4. Named cities and communities by the federal states with more than 50,000 inhabitants.

Before launch of LTE services in a subsequent Priority area is allowed, 90% coverage (taking into account the general availability of broadband access which also covers fixed broadband connections, fixed wireless broadband connections and mobile connections also by other operators) with regard to inhabitants in the previous priority area must be achieved. Thus, 90% coverage of priority clusters 1 is needed to start rolling out LTE-800 MHz networks in Priority Cluster 2 and so on. Despite these specific obligations to promote the availability of broadband access in White Areas, each 800 MHz spectrum rights holder had to reach a coverage rate of 50% of the population by 1 January 2016.

In Belgium, White Areas were not a major concern due to the fact that overall cable network coverage and fast xDSL broadband internet access coverage are both nearly nationwide (the cable network covered 96% of households in 2013 across Belgium, while 99% of the Belgian households were covered by ADSL, and 89 of households by VDSL). Nonetheless, BIPT identified 60 priority areas not covered by 3G which had to be covered by an 800 MHz spectrum rights holder. BIPT also imposed less strict coverage obligations on MNOs that were not 2G operators. All told, the final coverage obligation of 98% is significantly higher than in Germany with a 50% population coverage requirement.

Festlegungen und Regelungen für die Durchführung des Verfahrens zur Vergabe von Frequenzen in den Bereichen 800 MHz, 1,8 GHz, 2 GHz und 2,6 GHz für den drahtlosen Netzzugang zum Angebot von Telekommunikationsdiensten, p. 93 ff.

(http://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekommunikation/Unternehmen_Institutionen/Frequenzen/OffentlicheNetze/VergabeverfDrahtloserNetzzugang2010/PraesKammerEntschg_Id17404pdf.pdf?__blob=publicationFile&v=1).

Meanwhile, Germany has also imposed stronger coverage obligations for 700 MHz spectrum (98% of households nationwide and 97% of households in each of the 16 federal states). Less stringent obligations were imposed on potential newcomers using the 700 MHz bands, who must cover 25% of the population by 1 January 2021 and 50% by 1 January 2023.

- 800 MHz operators with 900 MHz or 1800 MHz spectrum (2G operators) had to fulfil the following coverage obligations: 30% population covered after two years; 70% population covered after four years; and 98% population covered after six years.
- 800 MHz operators that are not 2G operators had to fulfil the following coverage obligations: 30% after three years; 70% after six years; and 98% after nine years.
- One operator in the 811-821/852-862 MHz bands: 98% of the combined population of localities not covered by 3G within three years.

The German coverage obligations could be met by using any spectrum an operator has in the 800 MHz, 900 MHz, 1800 MHz, 2 GHz and 2,6 GHz bands.

2.2.3.2.7 MVNO and other access obligations

In this section, we discuss SMA practices in imposing licence conditions that entail wholesale access obligations in support of *Mobile Virtual Network Operators (MVNOs)* or infrastructure sharing obligations.

SMAs sometimes impose wholesale access obligations in order to promote provision of retail service by alternative operators that rely on the established mobile network operators. This can serve as an alternative instrument to pure infrastructure competition as a means to increase competition.

SMAs sometimes permit or encourage infrastructure sharing in order to reduce the network roll-out and network operating costs of network operators. An additional motivation for infrastructure sharing is the avoidance of needless environmental harm. Certain forms of infrastructure sharing may however weaken competition to the extent that networks necessarily are obliged to coordinate their behaviour to some extent.

MVNO access obligations imposed as part of the assignment process of ECS spectrum auctions have been the exception rather than the rule. For example, MVNO access obligations were imposed in France in the 800 MHz auction, in the Czech Republic in 2013 for the 2.6 GHz spectrum, in Spain for MNOs holding 2x10 MHz or more refarmed 900 MHz spectrum and providing 3G/4G services, and in Portugal in the 1800 MHz auction in 2011.

It appears that no other Member State within our EU17 sample imposed MVNO wholesale access obligations within a licence; however, MVNO access obligations are sometimes imposed in other ways, for example through competition law. In Finland, for example, DNA Oy and Telia Sonera Finland Oy offered the Finnish Competition and Consumer Authority (FCCA) a commitment that they will offer virtual and service operators access to their national networks, and that they will rent out mast and equipment location sites to competitors.¹¹¹ Similarly, Vodafone offered commitments to the Italian Competition Authority to provide MVNO access under certain conditions in response to a complaint by Tele2. These commitments were made binding by a decision of 24 May 2007.¹¹² MVNO access commitments are also sometimes required to obtain Commission merger clearance.¹¹³

In interviews, some network operators expressed the view that MVNO access obligations should not be imposed through licensing conditions because doing so bypasses the need to make a proper assessment of competitive needs. In France, for example, the MVNO commitments that were imposed empower the NRA to review the pricing of MVNO agreements. This is a power that the NRA would not have under the market review procedure of the RFEC absent a showing of joint dominance.

Some argued that imposition of MVNO obligations was superfluous in many Member States to the extent that MNOs willingly offer commercial agreements to MVNOs anyway – where this is the case, they would claim that an obligation is superfluous, but distorts the regulatory process.¹¹⁴

¹¹¹ <http://www.kkv.fi/en/current-issues/press-releases/2015/5.11.2015-fccas-decision-ensures-consumers-benefit-from-network-partnership-between-dna-and-sonera/>. See Finnish Competition and Consumer Authority (FCCA) / Kilpailu- ja kuluttajavirasto (KKV), DNA Oy:n ja TeliaSonera Finland Oy:n antamien sitoumusten määrittäminen noudatettaviksi matkaviestinverkko- ja palvelumarkkinoilla, Dnro 438/14.00.00/2014 of 5.11.2015 (<http://www.kkv.fi/globalassets/kkv-suomi/ratkaisut-aloitteet-lausunnot/ratkaisut/kilpailuasiat/2015/kielto--sitoumus--ja-toimitusvelvoiteratkaisut/r-2014-00-0438.pdf>).

¹¹² Autorità Garante della Concorrenza e del Mercato (AGCM), Case A357 - TELE2/TIM-VODAFONE-WIND, Provvedimento n. 17131 of 24 May 2007 (<http://www.agcm.it/component/domino/open/41256297003874BD/EEBC9E3AC494C6ADC12572F20055531F.html?Itemid=54>).

¹¹³ For example, in the Austrian 4 to 3 Merger, Case COMP M.6497 H3G / ORANGE, 11 November 2012 (https://www.drei.at/portal/media/bottomnavi/ueber_3/wholesale/2012h3gformalcommitments.pdf). See also Commission Decision C(2012) 9198 of 12.12.2012 addressed to: Hutchison 3G Austria Holdings GmbH declaring a concentration to be compatible with the internal market and the EEA agreement (Case N° COMP/M.6497 HUTCHISON 3G AUSTRIA / ORANGE AUSTRIA) (http://ec.europa.eu/competition/mergers/cases/decisions/m6497_20121212_20600_3210969_EN.pdf)

¹¹⁴ In particular, 800 MHz licencees committed in their licences to make full MVNO access available at economically reasonable conditions (*"Le caractère raisonnable s'apprécie notamment au regard des prestations fournies par les deux parties et de leur apport respectif dans la création et la mise en œuvre des services fournis par l'opérateur virtuel. À cet égard, la fixation des tarifs doit résulter d'une négociation reflétant les apports respectifs des parties à la création de valeur. Ces tarifs sont révisés, le cas échéant, en fonction de l'évolution des conditions prévalant sur les marchés avals concernés."*) The NRA is competent (under Art. 10, Authorisation Directive) to monitor compliance with the commitment and thus to assess the reasonableness of tariffs.

In the years since 2007, very few Member States have imposed MVNO service provider obligations in the assignment of spectrum. Examples include PT in 2011 for 800 MHz spectrum, and SK for 2.6 GHz spectrum.

Infrastructure sharing can comprise various network elements:

- Site sharing;
- Mast sharing;
- RAN sharing, separate spectrum;
- RAN sharing, joint spectrum; or
- Core network sharing.

It is clear from Table 12 that site and mast sharing is allowed in most Member States. RAN sharing using separate spectrum is possible in six Member States (Austria, Belgium, the Czech Republic, France, Poland, and the UK), while RAN sharing using joint spectrum is allowed in only two Member States (i.e. Hungary (Magyar Telekom and Telenor Hungary in 800 MHz) and Sweden (Telenor and Tele2, for 2G and 4G, including joint ownership of spectrum licences)). Core network sharing is not allowed in any of the EU 28 Member States.

Table 12: Infrastructure sharing obligations imposed on operators – number of Member States, EU 28, 2007-15¹¹⁵

	Site sharing	Mast sharing	RAN sharing, separate spectrum	RAN sharing, joint spectrum	Core network sharing
Yes	26	26	6	2	0
No / Not allowed	2	2	21	26	28

Source: WIK Consult/Cullen International.

This suggests that there is a rough consensus that site and mast sharing enable MNOs to save network roll-out costs without undermining competition, and thus should be allowed. On the other hand, RAN sharing with joint spectrum and core sharing raise competitive concerns.

¹¹⁵ The table records any infrastructure sharing obligations included as part of a requirement for an award of 700 or 800 MHz licences.

Once again, the differences in the Member States' treatment of MVNO obligations and in permission for infrastructure sharing are not necessarily a defect. The differences may reflect legitimate differences in Member State competitive circumstances.

2.2.3.3 Trading and other forms of reassignment of spectrum

Spectrum trading or leasing and refarming (collectively referred to as the use of *secondary markets* for radio spectrum resources) can serve to promote the efficient usage of spectrum by enabling a voluntary reassignment of inefficiently assigned spectrum user rights. In doing so, they can promote competition, and can also promote investment and innovation in the interest of the customers.

Important indicators in this regard include (1) the year in which frequency trading and/or leasing was transposed into national law, (2) the bands for which spectrum trading and/or leasing is allowed, (3) the procedural rules for trades and/or leases, and (4) whether a register of licenses exists (comprising current assignments, the names and addresses of spectrum users, and the rights they have). Many would consider such a register to be an essential prerequisite for a transparent and effective frequency trading/leasing regime.

Our primary focus here is on the 700 MHz and 800 MHz bands.

2.2.3.3.1 Frequency trading and leasing

The possibility for the EU Member States to allow for trading of radio spectrum was already introduced under the EU 2002 regulatory framework for electronic communications networks and services, under Article 9(3) of the Framework Directive; however, the full introduction of spectrum trading at the EU level began in earnest with the adoption of the revised 2009 regulatory framework for electronic communications, under the new Article 9(b) Framework Directive that states:

- 1) Member States shall ensure that undertakings may transfer or lease to other undertakings individual rights to use radio frequencies.
- 2) Member States shall ensure that an undertaking's intention to transfer rights to use radio frequencies, as well as the effective transfer thereof, is notified in accordance with national procedures to the competent national authority responsible for granting individual rights to use and is made public.

The Radio Spectrum Policy Programme (RSPP) obliges Member States to permit the transfer or leasing of spectrum usage rights in the 800 MHz, 900 MHz, 1.8 GHz, 2 GHz, 2.6 GHz and 3,4-3,8 GHz bands by 1 July 2015 (Article 6(8) and Article 14).

Spectrum trading is permitted in most Member States of our EU 17 sample subject to approval by the SMA (in Italy, by the Ministry). In Finland, by contrast, trading is forbidden in general; however, there is a specific rule that, in case of frequencies awarded in auctions, trading is allowed subject to government approval.

Some Member States enabled spectrum trading shortly after the enactment of the RFEC in 2002; other Member States enabled it only after the amendments on 2009.

- Early Member States: Austria (2003), Denmark (2002), France (2004), Germany (2004), Sweden (2003), and the UK (2004)
- Late Member States: Czech Republic (2011), Hungary (2013), Ireland (2011), and Italy (2012)

The ability to engage in spectrum trading appears to be highly appreciated by spectrum users; however, the institutional arrangement for frequency trading seems to be different across the Member States. This might be the reason why the United Kingdom and Sweden are the two Member States with significant amount of trades, while the number of trades in other Member States is minimal. As Ofcom¹¹⁶ points out, in the past 10 years, there have been over 13.000 spectrum trades in the UK (equivalent to 2% of the stock of licences each year). The vast majority of these UK trades have been administrative trades with limited commercial significance relating to fixed links / business radio (for instance, for taxis). There have, however, also been around 60 trades in the UK of high-value, block-assigned licences, with most of these being commercially driven deals between unrelated parties. The UK has also introduced the ability for holders of most block-assigned licences to lease their spectrum.

The existence of a register of licences, comprising the current assignment table (name and address of users) and user rights serves as an indicator of the diversity of institutional arrangements. Large differences among the Member States are manifest. In many Member States including Cyprus, Germany, Greece, Hungary, Ireland and Italy, no public register is available. In others, a register exists but individual licences or the users of specific bands are not recorded. Even in Austria, there is no list of spectrum assignments that have been assigned using first-come first-served procedures. In our view, full transparency is a prerequisite for an effective spectrum trading regime, but it seems that not all Member States have reached full transparency.

¹¹⁶ OFCOM (2015), Response to Commission Public Consultation on the Review of the Regulatory Framework, December 2015, para. 53.

Table 13: Availability of a register of licences, comprising the current assignment table (name and addresses of users) and user rights, EU 28, 2015

Country	Availability of a register of licences, comprising current assignment table (name and address of users) and user rights: link + date of its implementation
AT	<p>With regard to the licences that have been auctioned by the NRA (including all bands of the RSPP), the NRA provides comprehensive information on the licences and licensees on its website since the NRA was established in 1997.</p> <p>This information is however structured in the form of a website with explanations and hyperlinks, not as a register with a searchable table. There is also a list on completed trades. Addresses of all Austrian operators (not only those that have spectrum licences) can be found in the register of services that have been notified under the general authorisation scheme.</p> <p>There is no public register of the spectrum licences that are issued by the Telecommunications Offices on a first-come first-served basis (not in the RSPP bands).</p>
BE	<p>BIPT publishes a table on the existing right of use in Belgium, including the name of the operators/users (last updated on 10 December 2015).</p> <p>BIPT frequency allocation table provides information on spectrum use in Belgium (last updated in January 2014).</p>
BG	<p>CRC keeps the following public registers:</p> <ul style="list-style-type: none"> • Register for the permits/licences granted for use of individually assigned radio frequencies – defining exactly licensee – name of the entity, type of the entity - state body or a municipality, trader/undertaking, identification No, representative, website, address and other contact data; • Registers for all the networks and services run using definite radio frequencies, dependent on the exact frequencies; • Register for secondary traded frequencies and the leased ones, providing information for the grantor and the transferee
CY	No publicly available register of licenses.
CZ	Database on assigned spectrum but it doesn't contain individual licences. Details on licence holders are available on request.
DE	<p>No publicly available register of licences</p> <p>However, the bands mentioned in the RSPP have all been auctioned by BNetzA (with the exception of the 3,6–3,8 GHz band) and the licences in the bands <3 GHz are all held (directly or indirectly) by the three mobile network operators. BNetzA provides detailed information on these auctions and the resulting licences on its website. BNetzA also provides information on the licences auctioned in 3,4–3,6 GHz band.</p>
DK	<p>Frekvensregistret operated by the NRA.</p> <p>Implemented following adoption of Act No. 421 of 6 June 2002.</p>
EE	<p>Notifications and licences of any economic activities are collected in the Registry of Economic Activities. It was introduced on 15 April 2004 (Act of Registry of Economic Activities from 11 February 2004).</p> <p>The Registry allows to perform search of frequency licences by holder, type of a frequency licence, date of registration, date of modification and validity term.</p>

Country	Availability of a register of licences, comprising current assignment table (name and address of users) and user rights: link + date of its implementation
ES	Register of spectrum licences held by the Ministry of Industry Set up end 2008 under the spectrum decree (information in the register is not complete and up to date)
FI	No public register available: NRA website lists “radio licensees” in the main spectrum bands.
FR	Online database ‘E-spectre’ available (but currently under revision > should be back online in May 2016). Launched in Feb. 2008 .
GR	No publicly available register of licenses.
HR	The frequency allocation table was updated with the amendments to the Ordinance on the use of radio spectrum frequencies on 10 August 2015. HAKOM database on licences issued.
HU	No register available
IE	No, but basic details of the major licence types can be found on the ComReg website
IT	No public register available
LT	A list of current licences (including name and licence conditions) are available on RRT website: http://www.rtt.lt/lt/verslui/istekliai/radijo-dazniai/rrt_leidimai_dazniams.html (Date of implementation – not available) There is no public register for spectrum usage of which does not require a licence.
LU	Frequency register Implemented following adoption of the Law of 30 May 2005 organising the management of radio frequencies.
LV	SPRK assignment table
MT	No register of licences is available. Copies of the major spectrum licences are found in a specific section on the MCA website.
NL	National frequency register Implementation date unknown, but shortly after the 1998 Telecommunications law entered into force.
PL	UKE periodically updates overview of nationwide licences ; separately updates overview of mobile licences and other licences (based on Article 116(2), implemented by the amendment of 16 November 2012)
PT	Register of Frequency Rights (date of implementation being researched)
RO	Not applicable: There is a table with all the frequencies and their applications (TNABF), but it does not list the users.
SE	Overview of licences in WAPECS bands with information about licence holders and links to relevant assignment decisions (and ongoing assignments) regularly updated on PTS website . Implemented following adoption of the 2003 electronic communications act.

Country	Availability of a register of licences, comprising current assignment table (name and address of users) and user rights: link + date of its implementation
SI	AKOS spectrum register Implemented following adoption of the 2004 Electronic Communications Act (ZEKom)
SK	List of licences issued (2004).
UK	Ofcom Wireless Telegraphy Register , December 2004. Implemented following adoption of the 2004 Wireless Telegraphy (Register) Regulations .

Source: Cullen International.

The extent of frequency trading and leasing in the WAPECS bands is described in Table 14. Since 2002, several significant trades have occurred and have thus contributed to an efficient reallocation of spectrum user rights. Particularly important trades of spectrum have occurred in instances of mergers or insolvency.

Table 14: Actual frequency trading or leasing in WAPECS bands, EU 17 sample, 2002–15

	Evidence of actual frequency trades in WAPECS bands
AT	T-Mobile had to divest spectrum in the 2 GHz band after acquiring tele.ring in 2006. Trades following the merger of Hutchison 3G Austria and Orange Austria in 2012.
ES	Licence holders in the 3.5 GHz bands transferred part of their usage rights (only in some autonomous communities) <ul style="list-style-type: none"> Iberbanda to Telefonica (Jan. 2015-Dec. 2018) Eurona Wireless to Open Cable (Dec. 2013-April 2020) (Eurona Wireless acquired its licence from MRF Cartuja S.A.) Neosky transferred rights of use to Eurona Wireless (May 2012 until May 2018) and to Red Digital de Telecomunicaciones of the Balearic Islands (Jan. 2013-June 2019)
FI	Following the bankruptcy of Datame in Nov. 2013, the government approved the transfer of its 2.6 GHz (TDD) licence to Ukkoverkot. (Government decision of May 8, 2014)
FR	Several trades in the 3.4-3.6 GHz band (List in ARCEP report on WLL rollout - May 2011, p. 18)
NL	In September 2007, KPN sold 2x5 MHz of 900 MHz spectrum to T-Mobile for an undisclosed amount. KPN had obtained this spectrum when it acquired Telfort in June 2005.
PT	Onitelecom/F300 (3.5 GHz band) in May 2011.
SE	On 7 February 2012, PTS approved the transfer of the following spectrum to Net4Mobility, a joint venture of Telenor and Tele2: <ul style="list-style-type: none"> entire assignments in the 2.6 GHz band held by Telenor and Tele2 and in the 900 MHz held by Swefour; parts of assignments in the 900 MHz band held by Telenor and Tele2. On 15 August 2011, PTS approved the transfer of 2x25 MHz of spectrum in the 1800 MHz band held by Telenor, Tele2 and Swefour to Net4Mobility. On 22 December 2010, PTS approved the sale of the licence for 50 MHz unpaired spectrum held by Intel Capital to Hi3G.
SI	Tušmobil bought from Vega, which exited the market in 2006, 2x15 MHz in the 1800 MHz band for an undisclosed fee. The NRA later changed this into 2x5 MHz in the 1800 MHz band and 2x10 MHz in the 900 MHz band.
SK	RU publishes a list of completed transfers. Only local players made use of spectrum trading.
UK	EE sold 2x15 MHz of its 1800 MHz spectrum to H3G in August 2012 as part of the conditions of the Orange/T-Mobile merger that created EE (Update). Qualcomm sold its 40 MHz of 1.4 GHz spectrum to H3G and Vodafone (20 MHz each), with the consent of Ofcom in September 2015.

Source: Cullen International.

In line with Article 9(b) of the Framework Directive, spectrum trading has now been implemented across the European Member States; however, there are some indications that the institutional setup is different across the Member States (for instance, in terms of the availability of a public register). As a consequence, there seem to be differences with regard to the effectiveness of the trading regimes among the Member States. The lack of a comprehensive and transparent public register has to be considered to be an institutional deficiency.

2.2.3.3.2 Mechanisms to incentivise broadcasters to give up spectrum user right for 700 MHz / 800 MHz spectrum

Compensation payments can be used to incentivise broadcasters to give up spectrum user rights. This is a way to speed up the refarming of spectrum to make it available for more efficient use. Member States have implemented highly divergent compensation mechanisms for migration of broadcasting services in the 700 MHz and 800 MHz bands. For example, no compensation payments were made in several Member States. In Spain and the UK, compensation payments were made both to the public broadcasters and to the viewers for replacing their equipment (e.g. to buy digital set top boxes).

Table 15: Compensation payments for broadcasters (€ / MHz) when spectrum user rights were freed up for 700 MHz and 800 MHz, EU 17, 2002–15

No compensation paid		BE, CZ, DE, FI, IE, NL, PL, PT, SE, SK
Compensation (paid or foreseen) for migration of broadcasting services		
AT	Austrian Digitization Fund: state aid for the migration from analogue to digital broadcasting (incl. DVB-T tests, migration costs and vouchers for DVB-T set-top boxes for low income users).	
ES	Yes, to public broadcasters (national and regional) for simulcasting in old and new frequencies until the end of the migration process and viewers	
SI	Low income households received free digital set-top boxes from state.	
UK	To broadcasters (for the affected viewers, broadcasters and multiplex operators), and to PMSE users whose equipment would not work in possible relocation channels based on 55% of the cost of replacing the equipment.	

Source: Cullen International.

2.2.3.4 Method for determining annual spectrum usage fees

Under Article 13 AuD in conjunction with Article 8(2)(d) FWD, NRAs should, *inter alia*, use spectrum fee structures that provide incentives for efficient spectrum usage so as to ensure the optimal use of these resources. There is a growing preference among SMAs to migrate away from fees which historically sought solely to cover the administrative costs of spectrum management, and toward *administrative incentive pricing (AIP)* that seeks instead to calculate fees based on the opportunity cost or scarcity value of spectrum. Such spectrum fees arguably promote competition, and incentivise investments and innovation to the interest of the customer. If spectrum is held by a user who does not highly value it, AIP-based fees may encourage a correction in the form of a trade or lease by making tangible the opportunity cost of holding the unneeded spectrum.

AIP has been implemented to date, however, only in a few countries such as Finland, Spain and the United Kingdom.

Table 16: Spectrum bands for which AIP is implemented, date of implementation and fee formula for the countries in which AIP is actually implemented, EU17

Country	Spectrum bands for which AIP is implemented	Date of implementation (specify if different for different bands)
FI	<p><i>For all spectrum bands:</i></p> <p><i>Users:</i> Licences awarded without an auction for:</p> <ul style="list-style-type: none"> • electronic communications networks • broadcasting (DTT) networks, excl. MUX reserved for free-to-air channels that contribute to general interest objectives (designated by the NRA) • the military 	<p>Electronic communications and broadcasting networks: Licences awarded after 1 January 2015 without an auction.</p> <p>Military: from 1 January 2024.</p> <p>The annual fee is calculated based on the regulated formula and coefficients.</p> $B * K1 * Kasuk * Ktark * \text{€ } 9300$ <p>B = amount of spectrum in MHz</p> <p>K1 = frequency band coefficient, determined on the basis of technical and economic value</p> <p>Kasuk = population coefficient, determined on the basis of the population coverage</p> <p>Ktark = usage coefficient (different coefficients for TV broadcasting, telecoms and military)</p> <p>(Article 288 of the Information Society Code 917/2014, in EN)</p>

Country	Spectrum bands for which AIP is implemented	Date of implementation (specify if different for different bands)
ES	<i>For all spectrum bands</i>	<p>Applied from 2003.</p> <p>The same formula applies to all spectrum fees (including broadcasting and telecoms services).</p> <p>Annual spectrum tax is based on the market value which is given to spectrum (band and service dependent). It is calculated using coefficients which may be reviewed annually.</p> <p>Calculation formula</p> $T = S \text{ (km}^2\text{)} \times B \text{ (kHz)} \times F(C1, C2, C3, C4, C5) / 166.368$ <p>Where:</p> <ul style="list-style-type: none"> • S = service area • B = bandwidth reserved (KHz) • C1 to C5 = coefficients measuring band congestion, service type, band and sub-band, equipment and technology, and economic value of spectrum (C5). • 66.368 = euro/peseta conversion rate <p>Legal basis: Telecommunication Law of 3 November 2003. Applicable factors and coefficients were last set by the <u>2015 Budget Law</u>.</p> <p>80% of this tax goes into financing public service broadcasting, up to € 330m annually.</p>
UK	<p>AIP has been gradually introduced in UK for most services where spectrum is not auctioned, except DTT, where Ofcom <u>expects</u> to implement it by 2020.</p> <p>Includes 900 and 1800 MHz spectrum that was awarded for electronic communications without an auction.</p>	<p>The spectrum pricing framework in UK was changed in 1998 with the <u>Wireless Telegraphy Act 1998</u>, since then replaced by the <u>Wireless Telegraphy Act 2006</u>, to allow fees to be set above the level needed to recover spectrum management costs (i.e. AIP).</p> <p>900 and 1800 MHz: In December 2010, the Government issued a <u>Direction</u> (2010 No. 3024) which required Ofcom to revise the fees payable for licences to use radio spectrum in the 900 MHz and 1800 MHz bands so that they reflect full market value.</p>

Source: Cullen International.

Only a limited number of SMAs have currently made use of AIP; however, AIP could be a useful tool if spectrum were to become more scarce, and/or if it were to become necessary or useful to encourage spectrum users to change their current spectrum user rights and move to less congested spectrum bands.

2.2.4 Institutional functioning

Spectrum management is not an exclusive competence of the European Union. There are global, regional, EU and Member State competences that interact with one another. This complex interwoven fabric of authority and responsibilities is reflected in current institutional arrangements within the EU. It has strongly influenced how European spectrum management arrangements have functioned to date, and also influences how they might be able to evolve in the future.

Management of the radio spectrum has to be understood in terms of its global context. The management of spectrum at global level is a function of the *International Telecommunications Union*, specifically of the *ITU-Radiocommunications Sector (ITU-R)*.¹¹⁷ The use of frequencies is governed by an international treaty, the *ITU Radio Regulations*.¹¹⁸ They include a Table of Frequency Allocations that governs the use of radio frequency bands and lays down rules for the coordination, notification and registration of frequencies. The ITU's *Radio Regulations* are a key international reference.

At European level, the main technical actor is the *European Conference of Postal and Telecommunications Administrations (CEPT)* and its *Electronic Communications Committee (ECC)*. As the ECC explains, "*The Electronic Communications Committee (ECC) brings together 48 countries¹¹⁹ to develop common policies and regulations in electronic communications and related applications for Europe, and to provide the focal point for information on spectrum use. Its primary objective is to harmonise the efficient use of the radio spectrum, satellite orbits and numbering resources across Europe. It takes an active role at the international level, preparing common European proposals to represent European interests in the ITU and other international organisations. The ECC's approach is strategic, open and forward-looking, and based on consensus between the member countries. It applies its expertise in partnership with all stakeholders, the European Commission and ETSI to facilitate the delivery of technologies and services for the benefit of society.*"¹²⁰ The European Commission is empowered to issue mandates to CEPT to prepare harmonised conditions for the availability and efficient use of spectrum (see below); however, the CEPT reaches its own conclusions.

Relative to military spectrum, it is NATO that has authority and responsibility for agreed NATO bands. NATO membership includes many EU Member States, but not all; it also

¹¹⁷ One of the three sectors of the ITU. Its work is dedicated to spectrum management: see <http://www.itu.int/ITU-R>.

¹¹⁸ International Telecommunications Union (ITU) (2012), *Radio Regulations: Articles: Edition of 2012*.

¹¹⁹ Note that CEPT membership represents a considerably broader definition of Europe than the EU. It is for this reason that we generally refer to "countries" rather than "Member States" in this section.

¹²⁰ CEPT–ECC, What we do (<http://www.cept.org/ecc/who-we-are/what-we-do/>).

includes countries outside of Europe.¹²¹ As with CEPT, its membership thus reflects a different definition of “Europe” than that of the European Union.

The allocation, assignment, and management of radio spectrum within the European Union is administered by national administrations, inasmuch as radio spectrum remains principally the responsibility of the Member States. Moreover, within the Member States, there are often multiple institutions and agencies that have a say in spectrum management (including not only those responsible in the context of electronic communications, but also bodies responsible for audiovisual media, civil or military spectrum usage, and more).

The main role of the European Commission is to ensure that the use and management of radio spectrum in the EU complies with applicable EU law and takes into account all relevant EU policies.

A framework for Radio Spectrum Policy in the EU was launched in 2002 in parallel with the adoption of the RFEC, and particularly by the Radio Spectrum Decision.¹²² The Radio Spectrum Decision defines the policy and regulatory tools to be used to ensure the coordination of policy approaches and harmonised conditions for the availability and efficient use of radio spectrum for the internal market.¹²³

The Radio Spectrum Decision establishes a procedure for the adoption of technical harmonisation measures for the usage of individual spectrum bands. The Commission can issue a mandate to CEPT for expert technical preparatory work. In a second stage, the Commission adopts, under comitology procedure,¹²⁴ decisions ensuring common conditions for the availability and efficient use of radio spectrum.¹²⁵ This mechanism sometimes builds on technical recommendations of CEPT which fulfil EU regulation and policy objectives to adopt binding measures within the Union. It enables the adoption of highly prescriptive binding rules at Union level.

Overall, the implementation of EU decisions has led to the harmonisation of 1025 MHz of spectrum. In this regard, the Radio Spectrum Decision has been supplemented by a new tool for the coordination of the national spectrum policies, introduced by the 2009 review:¹²⁶ multi-annual radio spectrum policy programmes (RSPPs) (see also

¹²¹ NATO Members are listed here: http://www.nato.int/cps/en/natohq/nato_countries.htm.

¹²² Decision No 676/2002/EC of the European Parliament and of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision), [2002] OJ L 108/1.

¹²³ See for instance Whelan, A. (2014), Market Regulation in Network Industries: Subsidiarity and the Single Market in the Digital Age, in Kieran Bradley (ed.), *Of Courts and Constitutions: Liber Amicorum in Honour of Nial Fennelly*, Bloomsbury Publishing, p. 189.

¹²⁴ This procedure involves representatives of the Member States meeting in the context of the Radio Spectrum Committee set up under Art. 3 Radio Spectrum Decision. See also, Regulation (EU) N° 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers, [2011] OJ L 55/13, esp. Arts. 12 and 13.

¹²⁵ Art. 4(2)-(6) Radio Spectrum Decision, .

¹²⁶ Framework Directive, Art. 8(a), as introduced in 2009.

Section 2.2.2). The Commission, taking the opinion of the Radio Spectrum Policy Group (RSPG) into account, may submit legislative proposals to the European Parliament and the Council for establishing such programmes. These set out the policy orientations and objectives for the strategic planning and harmonisation of the use of radio spectrum. The first programme was adopted in 2012 by the RSPP Decision 243/2012/EU.¹²⁷ It identified a number of more precise regulatory principles and objectives, including regarding the flexibility of use rights. It laid down a common binding deadline of the end of 2012 for authorisation of all bands which had by then been technically harmonised for wireless ECS under the Radio Spectrum Decision, including the digital dividend spectrum in the 800 MHz band. In this way, Member States were obliged to carry out the authorisation process for the 3,4-3,8 GHz,¹²⁸ 2,5-2,69 GHz,¹²⁹ and 900-1800 MHz¹³⁰ bands by 31 December 2012. The programme provided for possible derogations to take into consideration delays due to factors such as cross-border spectrum coordination. Moreover, Article 4(8) of the RSPP states that “... *the Commission shall, in cooperation with Member States, and in accordance with the principle of subsidiarity, facilitate the identification and sharing of information of best practices on authorization conditions and procedures and encourage sharing of information for such spectrum to increase consistency across the Union*”. However, no specific mechanism is foreseen either for consultations between Member States and the Commission or for ensuring that best practices are in fact implemented.

The current RSPP has however not yet achieved a consistent application across the EU of the principle of neutral use of specific spectrum bands,¹³¹ which is important from the perspective of innovative and efficient use of spectrum. “*Apart from ensuring modification of the frequency tables in line with harmonisation decisions, there has been little consistency in promoting service neutrality in the rights of use of spectrum, as required by the RSPP decision (Article 3(f)). The refarming process, i.e., the process of changing the allowed uses of specific rights of use of frequencies, remains driven by Member-State specific factors*”.¹³²

¹²⁷ According to Recital 1 of this Decision establishing the first multiannual radio spectrum policy programme, “those programmes should set out policy orientations and objectives for the strategic planning and harmonisation of the use of spectrum in accordance with the directives applicable to electronic communications networks and services. Those policy orientations and objectives should refer to the availability and efficient use of the spectrum necessary for the establishment and functioning of the internal market.” See also Art. 8(a) Framework Directive.

¹²⁸ Commission Decision 2008/411/EC of 21 May 2008 on the harmonisation of the 3400 - 3800 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, [2008] OJ L144/77, .

¹²⁹ Commission Decision 2008/477/EC of 13 June 2008 on the harmonisation of the 2500 - 2690 MHz frequency band for terrestrial systems capable of providing electronic communications services in the Community, [2008] OJ L163/37.

¹³⁰ Commission Decision 2009/766/EC of 16 October 2009 on the harmonisation of the 900 MHz and 1800 MHz frequency bands for terrestrial systems capable of providing pan-European electronic communications services in the Community, [2009] OJ L274/32.

¹³¹ See Art 9.

¹³² European Commission (2013), Impact assessment Accompanying the Proposal for a Regulation laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives 2002/20/EC, 2002/21/EC and 2002/22/EC

This is despite the coordination between the Commission and the Member States fostered by the Radio Spectrum Policy Group (RSPG).¹³³ The RSPG is a group of national experts that formulates and adopts opinions and reports¹³⁴ that are aimed at assisting and advising the Commission at a strategic level on:

- radio spectrum policy issues;
- coordination of policy approaches;
- the preparation of multiannual radio spectrum policy programmes and
- achieving harmonised conditions, where appropriate, with regard to the availability and efficient use of radio spectrum necessary for the establishment and functioning of the internal market.¹³⁵

RSPG draft opinions are usually subject to public consultation.

The Members of the RSPG are senior representatives of the Member States, together with the official high-level representative of the European Commission. Delegations include representatives from both the regulatory authorities and the ministries having responsibility for radio spectrum related matters in each Member State.¹³⁶ The Chairperson of the RSPG is a Member elected by the Group for a period of two years.

The remit of the RSPG was extended in 2009.¹³⁷ Since then, the RSPG can also be requested by the European Parliament and/or the Council to issue an opinion or

and Regulations (EC) No 1211/2009 and (EU) No 531/2012 COM(2013) 627, SWD(2013) 331, 11.9.2013, p. 117.

133 Created under the Radio Spectrum Policy Group Decision 2002/622/EC. In 2009 the tasks of the Group were adopted to the modifications introduced by the reform of the Electronic Communications Regulatory Framework adopted in 2009 (see Commission Decision 2009/978/EU of 16 December 2009 amending Decision 2002/622/EC establishing a Radio Spectrum Policy Group, [2009] OJ L336/50.

134 For example, in 2014 and 2015, the RSPG examined issues related to efficient spectrum awards and use of harmonised spectrum bands for Electronic Communications Services (ECS). The RSPG analysed the spectrum requirements of future ECS, taking into account different geographical characteristics, market situations, and different usage scenarios so that spectrum is well utilized and future speed, capacity and coverage requirements are met. The RSPG concluded that there is no “one size fits all” and there isn’t one single method of awarding spectrum that could be extrapolated across all Member States or all bands without the risk of significantly diminishing overall consumer benefit and economic value. However, there are some key lessons that can be learnt from across the EU and globally in the approach to designing and conducting awards. The RSPG listed the best practice approaches to secure optimal use of the scarce resource that spectrum represents and to contribute to the development of the internal market for electronic communications, thus ensuring efficient use of spectrum and encouraging competition, growth and innovation in all aspects of the communications value chain for the benefits of consumers. See RSPG “the last 3 years”, RSPG15-628, 15 October 2015, p.6. The Report on “Efficient use of Spectrum and Spectrum awards” has been adopted on 24 February 2016.

135 Art. 2 Radio Spectrum Policy Group Decision.

136 *Idem* Art. 3.

137 Commission Decision 2009/978/EU of 16 December 2009 amending Decision 2002/622/EC establishing a Radio Spectrum Policy Group, [2009] OJ L336/50.

produce a report on specific radio spectrum policy issues relating to electronic communications.¹³⁸

The selection of the holders of individual rights of use for radio frequencies and the conditions under which such authorisation takes place are also the province of the Member States, as long as they comply with the general principles set forth in the Framework and Authorisation Directives, such as ensuring optimal use of spectrum resources. The broad discretion enjoyed by competent national authorities¹³⁹ in determining the form and amount of fees was confirmed by the Court of Justice following a request for a preliminary ruling from Belgium.¹⁴⁰ The case law has also confirmed the broad authority of competent national authorities in making the complex economic assessments underlying the licensing of valuable spectrum for wireless communications, for which identical criteria applicable to all Member States and all procedures tend to be unsuitable.¹⁴¹ The broad formulation of the conditions that Member States may attach to spectrum rights of use under part B of the Annex to the Authorisation Directive effectively provides Member State Spectrum Management Authorities with broad discretion. This is particularly the case with the item 7 in Part B of the Annex, which enables imposition as a condition for rights of use for radio frequencies of any “*commitments which the undertaking obtaining the usage right has made in the course of a competitive or comparative selection procedure*”.¹⁴² Item 7 gives the Member State the power to *accept* undertakings from selected applicants instead of imposing obligations under the applicable procedures. For example, in 2013, the EU Commission noted that “in some 10 Member States, MVNO access is provided for mainly through attachment as a condition to spectrum assignments rather than as the result of a market analysis based on the existence of significant market power”. The commitments made by the undertakings are voluntary only to a limited extent. In many cases, the applicants are confronted with a ‘take it or leave it’ dilemma. This is also the case as regards the acceptance by the bidders of the reserve prices set by the Member States, even when these prices appear flawed (see point 2.2.3.2.3 above). The general drafting of Article 13 AuD does not seem specific enough to protect applicants against such “flawed” reserve prices. If at least some applicants accept to pay reserve prices, how could the EU Commission challenge the level of the reserve price set as disproportionate in relation to the intended purpose?

¹³⁸ Art. 2 Radio Spectrum Policy Group Decision .

¹³⁹ The European regulatory framework for electronic communications uses in this regard different concepts: “competent national authority”, “relevant authority”, “national regulatory authority”. On this issue, see section 2.2.5.4.3.1.

¹⁴⁰ Case C-375/11 *Belgacom and Others v. Etat belge*, ECLI:EU:C:2013:185.

¹⁴¹ Case C-85/10 *Telefónica Móviles España v. Administración del Estado and Secretaría de Estado de Telecomunicaciones*, ECLI:EU:C:2011:141, in particular paras 28 and 34-36. See also Court of Justice, Case C-431/07 P *Bouygues and Bouygues Télécom v. Commission*, ECLI:EU:C:2009:223, esp. para 125.

¹⁴² European Commission (2013), Impact Assessment accompanying the proposal for a regulation laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives 2002/20/EC, 2002/21/EC and 2002/22/EC and Regulations (EC) No 1211/2009 and (EU) No 531/2012 COM(2013) 627, SWD(2013) 331, 11.9.2013, p. 26). On this issue, see especially section 2.2.5.4.3.2.

In sum, a wide range of spectrum management measures are enacted at Member State level. These include the design of selection procedures; award fees and payment conditions; the most relevant assignment conditions, such as licence duration and renewal; coverage obligations; trading, leasing and sharing conditions; refarming; spectrum efficiency-related technical requirements; and market-shaping measures such as spectrum caps, spectrum reservation or wholesale obligations. Provided that the Spectrum Management Authority fulfils the very general rules and criteria set out by the EU regulatory framework for electronic communications, the process of granting individual spectrum usage rights (i.e. *assignment*) is managed at national level and in various ways across Member States, as the national authorities in charge may be ministries, national regulatory or other authorities, or a combination of these, and subject mainly to national considerations.

Current arrangements have both strengths and weaknesses. The delegation of many decisions to Member State level is consistent with the principle of subsidiarity, and helps to ensure that legitimate local preferences are accommodated. It further helps to ensure that decisions are taken by experts with sufficient knowledge of local circumstances.

At the same time, current arrangements arguably do not do enough to ensure consistent application of the principles of the RFEC across the Member States, and also arguably do not do enough to prevent occasional lapses from good practice on the part of individual Member States.

There seems to be substantial support in general for closer coordination at European level of national spectrum approaches.¹⁴³ Striking a proper balance between European and Member State authority and responsibility is however challenging, both in terms of (1) identifying mechanisms that improve on current arrangements, and in terms of (2) reaching agreement between the European institutions and the Member States.

Challenges on achieving agreement have been visible not only in the course of the discussions of the Commission's TSM Regulation proposal¹⁴⁴ that ultimately led to the adoption of the Open Internet Regulation 2015/2120¹⁴⁵, but also in the context of the

¹⁴³ "With regard to spectrum governance, in order to serve the future wireless connectivity needs of the EU, a common EU approach to governing spectrum access was welcomed by respondents in order to enable technologies to be used seamlessly, but respect for spectrum as a national asset is required." (European Commission (2016), Synopsis Report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, 20.4.2016, p. 21, <https://ec.europa.eu/digital-single-market/en/news/full-synopsis-report-public-consultation-evaluation-and-review-regulatory-framework-electronic>).

¹⁴⁴ European Commission, Proposal for a Regulation of the European Parliament and of the Council laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives 2002/20/EC, 2002/21/EC and 2002/22/EC and Regulations (EC) No 1211/2009 and (EU) No 531/2012, COM(2013) 627, 11.9.2013 ("TSM Regulation Proposal"). In this context, Member States rejected proposals to centralize spectrum competences.

¹⁴⁵ Regulation (EU) 2015/2120 of the European Parliament and of the Council of 25 November 2015 laying down measures concerning open internet access and amending Directive 2002/22/EC on

public consultation on the evaluation and the review of the regulatory framework for electronic communications launched by the Commission in September 2015.^{146, 147}

2.2.5 Outcomes and problem areas

2.2.5.1 Assignment mechanisms

The current assignment regimes are considered by most respondents to the Public Consultation to be reasonably effective in all relevant aspects (Question Q67).¹⁴⁸

- Transparency and regulatory predictability 65%
- Appropriate balance in terms of administrative burden 54%
- Promoting competition 73%
- Contributing to the development of the internal market 69%
- Promoting the interests of citizens in EU 69%
- Ensuring an efficient use of spectrum 67%

Auctions are considered to be the most effective assignment mechanism for ECS (42%), while beauty contests and hybrid models are favoured by only 20% (Q68).

76% feel that the assignment process in Member States significantly determines the markets for mobile electronic communications (e.g. the number and types of network operators) (Q76).

universal service and users' rights relating to electronic communications networks and services and Regulation (EU) No 531/2012 on roaming on public mobile communications networks within the Union, [2015] OJ L310/1.

¹⁴⁶ *"Member States expressed much resistance regarding coordination of spectrum valuation and payment modalities... Member States reject full harmonisation but are open to a more common approach to spectrum management, some could accept a peer review of national assignment plans as well as a certain level of harmonisation or approximation of conditions and selection processes. A number of Member States expressed their desire to remain flexible to support early take-up of new technologies and to adequately balance harmonisation and flexibility in order to be able to adapt to market demand"* (European Commission, Synopsis Report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, 20.4.2016, p. 8 and 9 (<https://ec.europa.eu/digital-single-market/en/news/full-synopsis-report-public-consultation-evaluation-and-review-regulatory-framework-electronic>)).

¹⁴⁷ Regarding spectrum management and in the context of the European 2015 public consultation, "the regulatory community encompassing both BEREK and RSPG was of the view that the EU already benefits from substantial coordination and harmonisation processes, and no further EU-level coordination procedures are necessary. However, RSPG showed openness to a peer-review mechanism as regards spectrum assignment" (*idem*, p. 21).

¹⁴⁸ Where we show a number prefixed with a "Q" in parentheses (e.g. "Q67"), it means that we are referring to responses to Questions 67 in the Public Consultation. While we present the percentages with regard to total responses here, the responses by categories of respondents (MNO, MVNO/SP, Satellite, Other ECS, Public Institutions, Broadcasting, Internet Content Providers, Vendors, Trade Organisations and Other) are presented in the annex.

However, 38% see significant and 21% moderate obstacles and difficulties due to lack of coordination across Member States for the development of electronic communications (Q71). Thus, 61% agree that a greater coordination of methods for granting spectrum usage rights and of selection process achieve greater consistency in the Union, thereby removing barriers to entry and promoting further competition and investment (Q77).

There is a strong agreement that more consistent spectrum assignment processes throughout the Union, based on greater harmonisation of the choice of selection or award methods on the basis of experience and best practice would be desirable (Q78):

- To ease the process for national administrations (56% agree, 23% disagree).
- To increase the predictability and planning sought by investors (66% agree, 27% disagree).

79% of all respondents agree that Member States should take a common approach when designing spectrum assignment procedures and conditions with the aim to deliver the required regulatory predictability and consistency in the internal market while reflecting local market specification. It should be highlighted that more than 80% of MNO respondents share this opinion. Only 20% of MNOs disagree (Q209).

The Consultation asked respondents for their views on the appropriate level of coordination with regard to the elements of the spectrum assignment process (Q79). The question posed the following alternatives:

- *General approximation:* setting only common or harmonised general objectives and principles, leaving the definition of exact criteria and solutions to the Member States.
- *Partial harmonisation:* Setting out common or harmonised general objectives and principles, as well as specific solutions for some of the items below (to be indicated), while leaving room for additional national conditions.
- *Full harmonisation:* Setting out common objectives, principles and specific solutions for specific bands or types of wireless definition of identical criteria and conditions for all Member States, creation of a common authorisation format or single common or totally synchronised selection process (as used for mobile satellite systems).

The responses are tabulated in Table 17.

Table 17: Stakeholder views as to the degree of coordination needed: selection process; transparency; selection process type; objectives; ex ante competition assessment; specific competition measures; selection timetable; information to market participants; frequencies and packaging of lots; spectrum valuation and pricing and fees; payment modalities; and ex post auction assessment and enforcement

Criteria	Not to be covered	General approximation	Partial harmonisation	Full harmonisation
Determination of need for a selection process	21%	29 %	23 %	27 %
Level of transparency to the market re selection process and conditions	15 %	17 %	21 %	47 %
Determination of the selection process type (auction, beauty contest, first come first served, hybrid model)	30 %	26 %	27 %	17 %
Objectives pursued by the selection process	20 %	28 %	17 %	35 %
The appropriateness of an ex ante competition assessment	21 %	24 %	24 %	31 %
The national authority which is responsible for the ex-ante competition assessment	56 %	16 %	10 %	18 %
The need for specific measures (spectrum caps/floors, new entrant spectrum reservation)	26 %	21 %	34 %	19 %
Selection timetable	19 %	26 %	28 %	27 %
Timing of advanced information to market participants	23 %	23 %	34 %	20 %
Frequencies covered, packaging of lots	22 %	26 %	30 %	22 %
Spectrum valuation and pricing, fees, charged	30 %	17 %	37 %	16 %
Payment modalities	32 %	20 %	37 %	11 %
Enforcement and ex post auction assessment and enforcement	34 %	23 %	22 %	21 %

Source: WIK evaluation of the reponses provided to the European Commission within the consultation on the review of the Regulatory Framework

One should be careful not to read too much into these results, inasmuch as the respondents are those who chose to respond. The sample is not free of *self-selection bias*. For a question to receive a plurality of responses is far from definitive.¹⁴⁹ Nonetheless, the results are striking.

The current situation according to the stakeholder views for most of these criteria is either “Not to be covered” or else “General approximation” (setting only common or harmonised general objectives and principles). There seems however to be surprisingly little support for maintaining the status quo.

- In no category is general approximation favoured by as much as 30% of respondents.
- In most categories, a solid majority favour either “partial harmonisation” or “full harmonisation”, which is to say a substantial departure from the status quo.
- A majority saw no need to cover “the national authority which is responsible for the ex-ante competition assessment”.
- Opinion was split fairly evenly as regards “determination of need for a selection process”, “determination of the selection process type (auction, beauty contest, first come first served, hybrid model)”, and “enforcement and ex post auction assessment and enforcement”, but with small majorities (50 – 57%) favouring either “not to be covered” or “general approximation” in each case.

68% see a need for more consistent assignment criteria and conditions between Member States in particular with regard to those criteria and conditions which have the greatest economic significance for investment predictability and business decision-making, for driving competition and for achieving the future connectivity needs (Q80). Only 28% disagree.

The Consultation also requested stakeholder views as to the degree of coordination needed for various aspects of the selection process (see Table 18). (Q82) One should be careful not to read too much into narrow pluralities since the responses to the Consultation cannot be assumed to represent a random or fully representative sample of stakeholders.¹⁵⁰

Results are somewhat similar to those of Table 17:

- In no category is general approximation favoured by as much as 30% of respondents.

¹⁴⁹ See for instance Arnold, R. C. G. et al. (2015), All But Neutral: Citizen Responses to the European Commission’s Public Consultation on Network Neutrality, in Belli, L. & Filippi, Primavera De (Eds.): *Net Neutrality Compendium - Human Rights, Free Competition and the Future of the Internet*.

¹⁵⁰ *Ibid.*

- In most categories, a solid majority (often as much as two thirds of respondents) favour either “partial harmonisation” or “full harmonisation”, which is to say a substantial departure from the status quo.
- In the case of coverage obligations or access / MVNO obligations, somewhat fewer respondents saw the need for harmonisation; in every other category, however, a plurality of respondents favoured “full harmonisation”.

Table 18: Degree of coordination called for as regards license duration; timing and conditions of renewal; trading and or leasing; coverage obligations; wholesale access obligations; limits under technology neutrality; technical performance characteristics; extent of services allowed and limits to service neutrality; sharing of spectrum or infrastructure; use it or lose it clauses; and refarming conditions

Criteria	Not be covered	General approximation	Partial harmonisation	Full Harmonisation
Licence duration	9 %	20 %	28 %	43 %
Prior notice, timing and conditions of renewal	14 %	20 %	25 %	41 %
Possibility to trade or lease assigned spectrum and related conditions	15 %	19 %	23 %	43 %
Coverage obligations	31 %	24 %	28 %	17 %
Wholesale access conditions(e.g. MVNO access)	50 %	15 %	15 %	20 %
Limits under technology neutrality	12 %	19 %	23 %	46 %
Requirements on technical performance characteristics	16 %	16 %	25 %	43 %
Extent of services allowed and limits to service neutrality	20 %	19 %	20 %	41 %
Possibility of sharing and pooling assigned spectrum or mobile network as a whole	18 %	24 %	24 %	34 %
In general, any conditions covered by the Annex of the Authorisation Directive	16 %	29 %	21 %	34 %
Use it or lose it clause	25 %	25 %	38 %	38 %
Refarming conditions	19 %	24 %	22 %	35 %

Source: WIK evaluation of the responses provided to the European Commission within the consultation on the review of the Regulatory Framework

In Consultation responses, only 40% of respondents expressed the view that there might be situations where regional processes involving a group of Member States could bring more value and a better development of electronic communications (Q83). In the interviews, however, several respondents representing large MNO groups felt that there might be merit in the medium to long term in simultaneous assignment of spectrum within clusters of adjacent Member States (for instance, the Nordic countries) as a means of mitigating cross-border interference concerns.

A majority of 57% of respondents saw no need for specific measures to ensure access of small and medium sized enterprises (SMEs) to harmonised spectrum. Not surprisingly, MVNOs took a different view (Q200).

Our stakeholder interviews provide a complementary view to the consultation results.

In the interviews, many of the network operators interviewed emphasised the need for:

- prompt release of WAPECS spectrum to the market;
- avoidance of excessive fees,
- increased minimum licence duration, with many asking for a minimum duration of 20 years, and some claiming that indefinite licenses represent best practice;
- continued emphasis on the mitigation of interference; and
- alignment of time windows for spectrum award among neighbouring Member States so as to mitigate the risk of cross-border interference.

2.2.5.2 More flexible spectrum management regimes to be implemented

72% of the respondents consider that a *more flexible and/or shared access* to spectrum is needed to meet the future demand for spectrum. Only 18% disagree (Q85),

Shared access was considered to be necessary (Q86) for the following applications:

- Wireless back-haul (only asked for by 34%, while 55% disagree)
- The development of the Internet of Things (68% agree, while 2 % disagree)
- The development of M2M applications (64% agree, while 24% disagree)

At the same time, 50% see no need for better *protected use* of spectrum for applications that rely on shared use of spectrum (such as Wi-Fi or short range devices) (Q87).

64% see a need for a common approach amongst Member States to *documenting sharing conditions and rules* and for granting shared spectrum access authorisations. Only 17 % disagree (Q89).

Respondents considered the following instruments to be appropriate (Q88) for achieving a *flexible use of spectrum*:

- Tradability and lease of spectrum (76 % agree, while only 12 % disagree)
- Use of white spaces (49 % agree, while 41 % disagree)
- Infrastructure sharing, including pooling (80 % agree, while 9 % disagree)
- Incentive auction (50 % do not know, while 27 % agree)

Thus, trading/leasing and infrastructure sharing are considered to be the most effective management instruments to promote a flexible use of spectrum.

Respondents saw a need for the adoption of certain measures in conjunction with any further *spectrum refarming* (Q 91):

- Further protect existing right holders (64 % agree, while 27 % disagree)
- Further support prospective spectrum users (36 % agree, while 37 % disagree)
- Maximise flexibility in spectrum management (70 % agree, while 17 % disagree)
- Allow new incentivising methods (41 % agree, while 23 % disagree)
- Further protect competition (35 % agree, while 43 % disagree)
- Clarify compensation conditions (56 % agree, while 14 % disagree)
- Apply 'use it or lose it' clauses (45 % agree, while 40 % disagree)

In the interviews, many operators opposed the use of '*use it or lose it*' clauses. Some argued that where there is an effective market based spectrum management regime covering auctions, AIP, trading and leasing, there should be no need for such a clause.

One operator argued that the enforcement in practice of a 'use-it-or-lose-it' clause might have a detrimental effect. The acquisition of spectrum usage rights does not automatically mean that spectrum is immediately used. Spectrum has an option value – operators may acquire it for use in the near future. Further, it may take time until incumbents fully clear the assigned spectrum, and it then takes time to build the network.

49% agree (and only 26% disagreed) that the *withdrawal or significant modification of rights* by public authorities is inappropriate where the application of service or

technology neutrality principles and/or the trading and leasing mechanisms are sufficient to ensure spectrum refarming¹⁵¹ (Q92).

48% agree that end-users should be entitled to *share the access to their Wi-Fi connection* with others as an enabler for the sustainable deployment of denser small cell networks in licence exempt bands (Q95).

67% support the *facilitation of deployment of commercial/municipal Wi-Fi networks* in public premises (e.g. public transportation, hospitals, public buildings) (Q96).

Nonetheless, 48% see no need for more licence exempt spectrum for M2M applications (with only 26% in favour) (Q97).

58% did not consider it appropriate to impose obligations in terms of quality of service, resilience of network infrastructure, or hardening to enable *dual use of commercial mobile networks with PPDR communications* (Q98).

2.2.5.3 Market and consumer outcomes

In Section 2.2.5.3.1, we consider the number of network operators in each Member State as a first order measure of competition. In Section 2.2.5.3.2, we review other measures of the marketplace.

2.2.5.3.1 Market entry (and exit) of competitors

As shown in Table 19, most Member States have either 3 or 4 MNOs today. A few have 5, 6, or 7 MNOs. This represents a significant overall increase since the Regulatory Framework came into force, and a general mark of the success of the Framework.

The number of MNOs has however contracted from 4 to 3 in some Member States in recent years, in line with competition policy (for example, in Germany). The Member States in which the number of MNOs declined in the time period between 2007 and 2015 are marked in orange.

Meanwhile, Table 20 shows the number of network operators that currently hold usage rights to spectrum in various bands that should be sufficient to enable them to offer facilities-based commercial mobile services. The 800 MHz and 900 MHz bands are particularly important due to their good characteristics in terms of propagation and building penetration, but the somewhat higher frequency bands are also significant. In most Member States (but not all), at least three network operators have suitable spectrum holdings.

¹⁵¹ We observe that this claim would become stronger to the extent that spectrum fees reflect the opportunity cost of use of the spectrum in question.

Table 19: Competition in mobile: Number of MNOs, EU 28, 2007 and 2015

Country	2007	2015	Country	2007	2015
AT	4	3	IE	4	3
BE	3	4	IT	4	4
BG	3	5	LT	3	4
CY	2	3	LU	4	4
CZ	3	3	LV	3	4
DE	4	3	MT	3	3
DK	4	4	NL	5	5
EE	4	3	PL	6	7
ES	4	4	PT	3	3
FI	3	4	RO	5	5
FR	3	4	SE	4	4
GR	3	3	SI	4	4
HR	3	3	SK	3	4
HU	5	4	UK	5	5

Source: Cullen International.

Table 20: Concentration of mobile spectrum: number of operators with sufficient spectrum usage rights to offer facilities-based service, EU 28, end of 2015¹⁵²

Country	800 MHz - at least 2x10 MHz	900 MHz - at least 2x10 MHz	1800 MHz- at least 2x20 MHz	2 GHz- at least 2x10 MHz	2.6 GHz - at least 2x20 MHz
AT	2	2	2	3	3
BE	3	3	3	3	2
BG		3		3	
CY		3	3	3	
CZ	3	3	2	3	3
DE	3	3	2	2	3
DK	3	1	2	4	3
EE	3	3	3	3	3
ES	3	3	3	4	3
FI	3	3	3	3	3
FR	3	2	3	3	2

¹⁵² The numbers shown are the number of operators with at least 2x10 MHz in 700 MHz; at least 2x10 MHz in 800 MHz; at least 2x10 MHz in 900 MHz; at least 2x20 MHz in 1.8 GHz; at least 2x10 MHz in 2.1 GHz; or at least 2x20 MHz in 2.6 GHz (EU 28) at the end of 2015.

Country	800 MHz - at least 2x10 MHz	900 MHz - at least 2x10 MHz	1800 MHz- at least 2x20 MHz	2 GHz- at least 2x10 MHz	2.6 GHz - at least 2x20 MHz
GR	3	3	2	3	3
HR	2	2	2	3	
HU	3	3	2	3	3
IE	3	3	2	3	
IT	3	2	2	4	1
LT	3	3	3	3	3
LU	3	2	3	3	3
LV	3	2	3	3	3
MT		2	2	3	
NL	3	3	3	3	2
PL	1			4	3
PT	3	1	3	3	3
RO	2	3	3	4	1
SE	4	1	3	4	3
SI	3	2	2	3	2
SK	3	3	1	3	2
UK	2	2	1	4	2

Source: WIK Consult/Cullen International.

It is natural to ask whether there might be a coherence problem between competition policy that permits effective market exit via merger, versus spectrum management policy that encourages market entry (by means, for instance, of release of new spectrum for ECS use to the market, spectrum caps, auction set-asides, and MVNO obligations). This is a complicated question, to which we return in Section 2.2.6.3. We have not found evidence of a coherence problem.

There is no clear consensus at the moment as to the “right” number of MNOs in any particular national market; moreover, one might well reach different conclusions depending on whether the objective is minimising consumer cost versus maximising MNO investment. A research result by Aghion et al. (2005)¹⁵³ plausibly suggests that investment by producers is maximised when there are neither too few competitors (no incentive to invest) nor too many (no opportunity to profit from investments). This result is by no means definitive, has been challenged with regard to mobile markets,¹⁵⁴ and in

¹⁵³ Aghion, P., N. Bloom, R. Blundell, R. Griffith and P. Howitt (2005), Competition and Innovation: an Inverted-U Relationship, *Quarterly Journal of Economics*, 120(2), pp. 701-728.

¹⁵⁴ E.g. WIK-Consult (2015), Competition & investment: An analysis of the drivers of investment and consumer welfare in mobile telecommunications, Bad Honnef 2015.

any case provides no guidance as to key questions such as whether three or four MNOs should be preferred in a Member State of a given market size.

All things considered, we are inclined to suggest that the two mechanisms collectively may serve to maintain a reasonable dynamic balance in the number of mobile competitors in each national market. Both sets of mechanisms consider competitive implications. Review of the evolution over time of the number of MNOs in each national market does not suggest, for instance, that there are frequent shifts back and forth between three and four MNOs in individual Member States (which might have suggested inefficient entry and exit).

Table 21 depicts a measure of the concentration of spectrum holdings in each of the 28 EU Member States. In our context, the *Herfindahl-Hirschman Index (HHI)* is a measure which reflects the concentration of spectrum user rights among the MNOs. Mathematically, it is the sum of the squares of the spectrum holding shares of all MNOs. The shares are expressed as a percentage. The HHI is expressed here as a number that lies between 0 and 1,0, where 1,0 would reflect that there is only one spectrum rights holder.

In competition economics, the HHI is often used to measure market concentration in terms of the number of customers held by firms in the market, or the share of revenues held by firms in the market.¹⁵⁵ In this instance, we choose to use substantially the same measure to denote concentration of spectrum holdings.

The HHI reflects both the number of competitors and their respective shares. An equal distribution is generally optimal. With three competitors, this would yield an HHI of 0,33; with four competitors, an HHI of 0,25.

For sub-1 GHz spectrum, the values vary between 0,17 in PL and 0,46 in AT. Thus in Austria, we observe the highest concentration of spectrum user rights. In the United Kingdom, we also identify a somewhat elevated concentration of spectrum user rights which is reflected by a value of 0.37. Most Member States are associated with a HHI of spectrum user rights around 0.33.

For above 1 GHz spectrum (up to 3,6 GHz), Poland again has the lowest HHI with a value of 0,19. The highest values are in Germany and Slovenia with a value of 0,38. Thus, a strong divergence of the concentration of spectrum user right holdings across the MNOs in different Member States is visible.

¹⁵⁵ In competition economics, the percentages are often multiplied by 100, thus yielding an expression of the HHI as a number between 0 and 10,000 (i.e. 100 x 100).

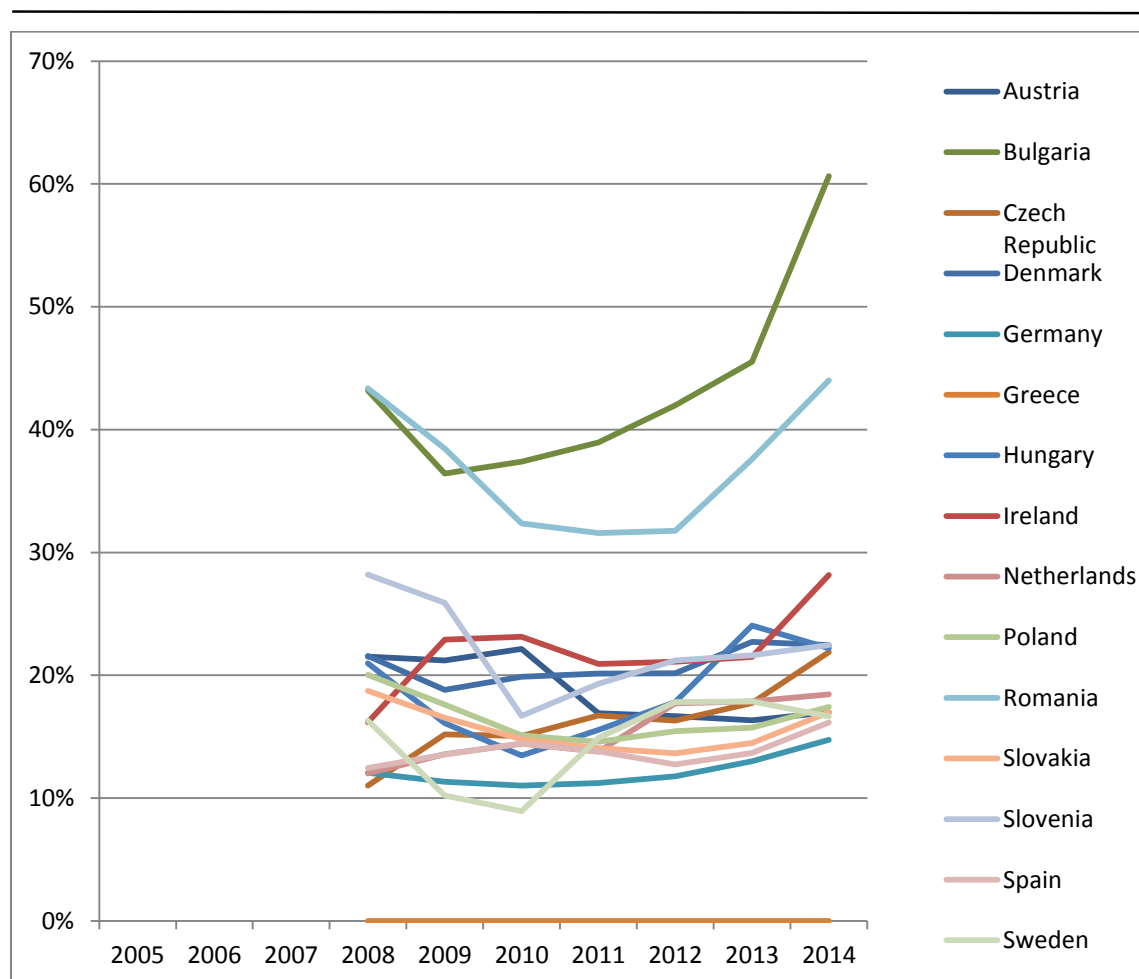
Table 21: HHI of spectrum assignments, EU 28, as of April 2014

	sub 1 GHz	above 1 GHz
AT	0.46	0.34
BE	0.33	0.28
BG	0.33	0.25
CY	0.34	0.33
CZ	0.34	0.33
DE	0.33	0.38
DK	0.28	0.25
EE	0.33	0.34
ES	0.34	0.27
FI	0.33	0.28
FR	0.26	0.27
GR	0.34	0.35
HR	0.43	0.34
HU	0.33	0.32
IE	0.34	0.37
IT	0.29	0.25
LT	0.33	0.26
LU	0.33	0.27
LV	0.33	0.29
MT	0.39	0.36
NL	0.27	0.25
PL	0.17	0.19
PT	0.34	0.34
RO	0.29	0.25
SE	0.23	0.24
SI	0.35	0.38
SK	0.33	0.34
UK	0.37	0.29

Source: Cullen International.

As previously noted, many assume that there is a relationship between the market structure and the level of investment, but there is no consensus as to what exactly that relationship (if any) might be. The average CAPEX per capita for MNOs are quite diverse among Member States (see Figure 11).

Figure 11: Investment in mobile: average CAPEX per capita for MNOs, selected Member States EU-15, 2008 – 2014



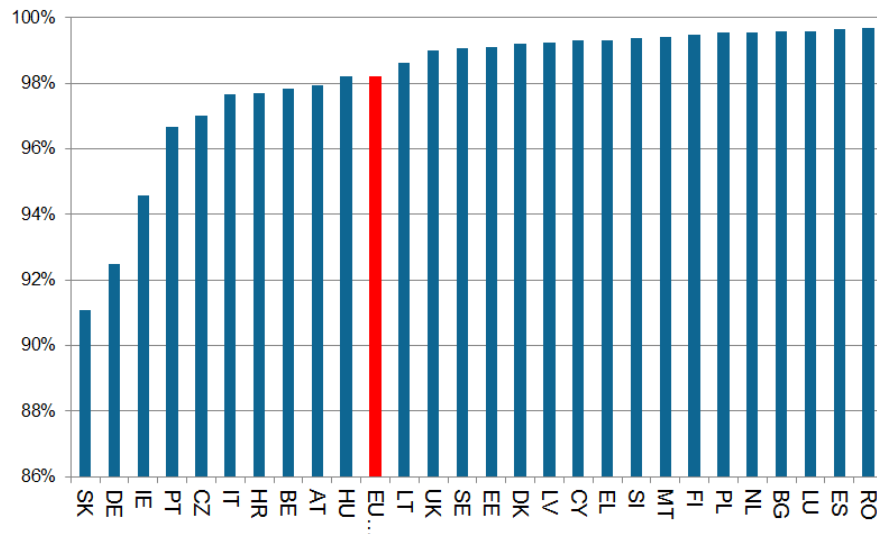
Source: IDATE.

2.2.5.3.2 Mobile coverage, penetration and prices

High speed mobile broadband coverage under various technologies is substantial, but varies among the Member States.

Most Member States enjoy high coverage of mobile broadband using 3G HSPA (high speed packet access), and coverage varies only slightly across Europe. Many Member States have more than 98% HSPA coverage of households. In only three Member States (Ireland, Germany and Slovakia) was the coverage below 95% in 2014.

Figure 12: Mobile coverage: Mobile broadband HSPA (% of HH), EU 28, 2014

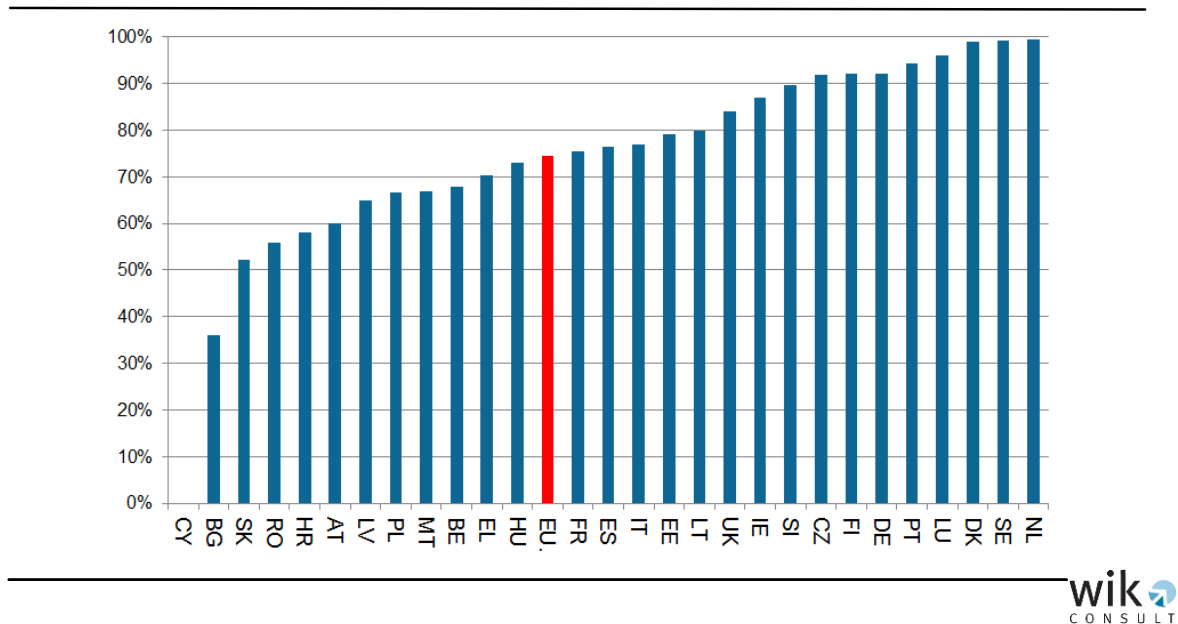


Source: IDATE.

Note: EL is the recommended abbreviation for Greece.

4G LTE coverage is much more diverse due to the delay in the assignment of 800 MHz spectrum. Coverage is almost 98% in Member States such as Denmark, Sweden and the Netherlands. Member States with a coverage of less than 60% (Austria, Croatia, Romania, Slovakia, Bulgaria, and Cyprus) lag far behind.

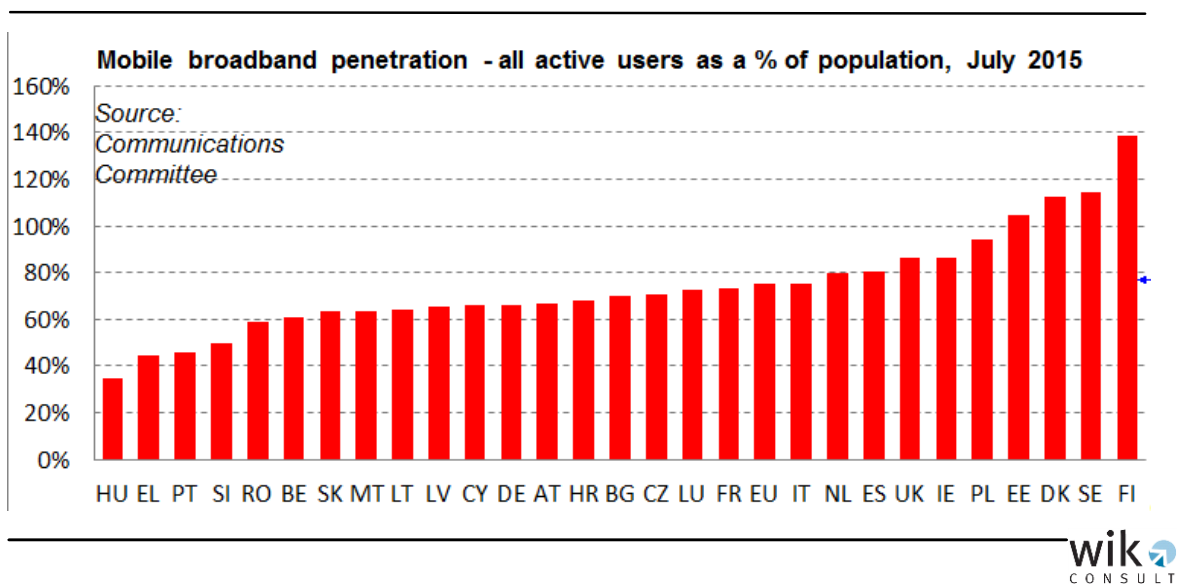
Figure 13: Mobile coverage: LTE (% of HH), EU 28, 2014



Source: IDATE.

Actual mobile broadband penetration (all active users) is even more diverse. While the nominal penetration level in Denmark, Sweden, Estonia and Finland is above 100% due to multiple SIM card use, most of the Member States fall in the range between 50% and 80% of active mobile broadband users in relation to the population.

Figure 14: Mobile broadband penetration: all active users (% of pop), EU 28, July 2015

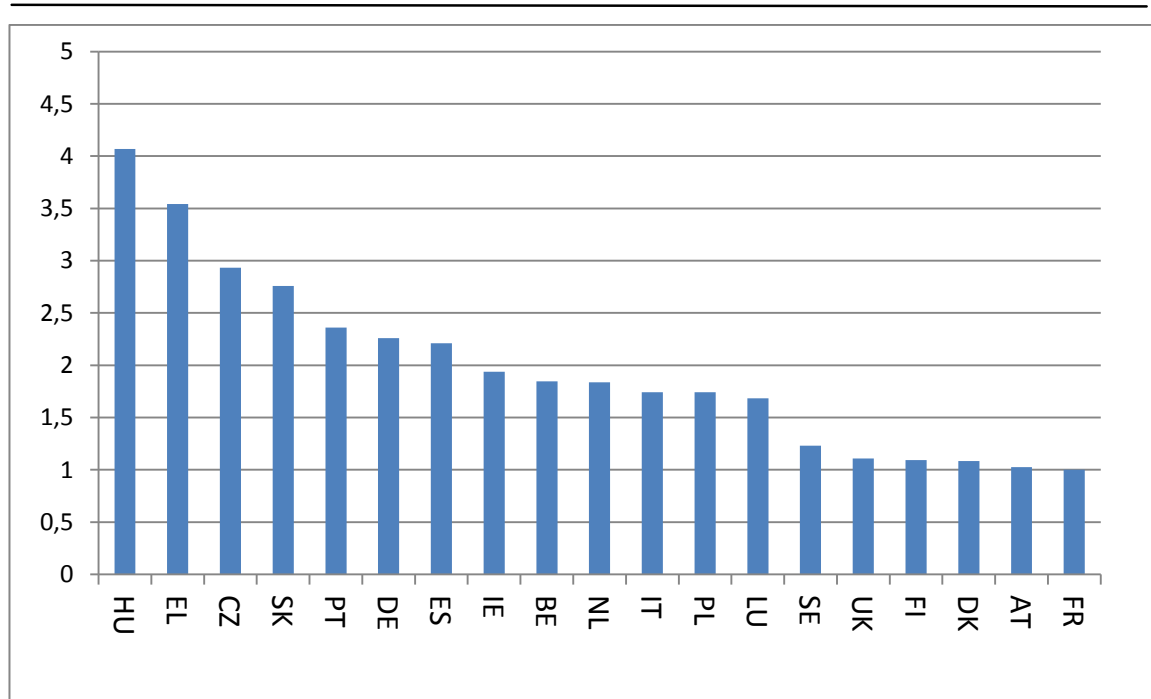


Source: Communications Committee.

Finally, Figure 15 provides a comparison of mobile prices across nineteen of the Member States, based on mobile “price baskets” as used by the OECD and by Teligen. The OECD methodology is based on a standard basket of monthly consumption that represents a nominal level of usage that can serve as a basis of comparison; however, that level is not intended to reflect specific usage patterns in any particular country.

The price levels across the European Member States are quite diverse. The lowest and the highest price level differ by a factor of four. France, Austria, Denmark, Finland, Sweden and the UK provide mobile services at the lowest price level.

Figure 15: Mobile price baskets (index; average of all baskets)¹⁵⁶, EU 19, 2014



Source: OECD.

2.2.6 Performance of RFEC provisions relating to access to spectrum

Our assessment follows the usual criteria of effectiveness, efficiency, coherence, relevance, and EU value added.

¹⁵⁶ The OECD baskets can be found in OECD (2015): OECD Digital Economy Outlook 2015. The values which are presented here are normalised such that the lowest price index (France (FR)) is set equal to one. The other price indices are set in relation to this normalised value. Thus, the price index in Hungary (HU) is more than four times higher than in France.

2.2.6.1 Effectiveness

Competition

The focus on *competition* is particularly relevant to the ECS services that are core to our analysis. Current arrangements provide many mechanisms to foster competition, including spectrum caps, set-asides, and MVNO obligations.

As noted in Section 2.2.5.3.1, most Member States have either three or four effective MNO competitors, and it is clear that substantial market entry has occurred since the RFEC was put in place. There was a net decline of two MNOs in 2015 for the first time since the advent of the RFEC; this bears watching, but it would be premature to treat it as a substantial change in the overall trend.

As regards *efficient use*, current arrangements demonstrate many elements of strength, but also some weaknesses. Delays in assignment of 800 MHz and 2.6 GHz spectrum can be viewed as being failures in terms of *investment and innovation*, but it is clear that they represent a loss of efficiency as well. The delays in assignment prevent network operators from migrating to more efficient technology, for instance, and oblige them to deploy more cell sites than would be needed if more desirable spectrum resources had been available. MNOs in countries such as Germany that assigned 800 MHz spectrum promptly were limited in their ability to deploy due to the risk of cross-border interference from services in neighbouring countries that were slow to assign 800 MHz spectrum.

The significance of these very substantial delays and resulting gaps between first and last movers cannot be over-stated. *Spectrum delayed is spectrum denied.*¹⁵⁷ Potential efficiencies are foregone. Whether justified or not, lack of predictability imposed costs on the sector.¹⁵⁸ While such costs are difficult to quantify, it is clear that huge delays for 800 MHz and 2.6 GHz spectrum, together with time gaps before all Member States have assigned the same band, prevent equipment manufacturers, as well as operators and their customers, from fully benefiting from economies of scale.

Isolated instances of poor practices in spectrum assignment also represent a negative impact on efficient use. Desk research and stakeholder interviews suggest a number of instances of flawed award procedures, such as setting reserve prices too high in order to fill budget gaps in the Member State in question, or auction designs that had obvious defects. The Member States are obliged to publish their procedures, but *there is no meaningful external oversight or review of the procedures that they put in place.*

¹⁵⁷ This is a paraphrase of the famous phrase attributed to UK Prime Minister William Gladstone: "Justice delayed is justice denied." Legal relief that comes too late is scarcely better than no relief at all.

¹⁵⁸ Substantiated by interview comments by an incumbent mobile network operator.

Internal market / consistency

Turning to *consistent regulatory practice*, it is important to note that Article 8 of the Framework Directive *calls for consistent practice but not necessarily for consistent outcomes*. One can debate whether the differences in regulatory practice among SMAs in the EU today are too great, but the RFEC provides little concrete guidance against which this could be measured.

Our concern is that spectrum management practice and outcomes are in a number of respects *not only divergent among the Member States, but also in certain respects clearly flawed*. The delays in assignment of the 800 MHz band and the various auction defects already identified are the clearest examples.

In terms of technical competence, the RSPG has the requisite know-how to play some kind of an oversight role; however, they have neither the legal competence, nor any incentive to do so. Indeed, their position is not very different from that of the ERG prior to the reforms of 2009 – as long as their membership is comprised solely of voluntary participation of SMA employees, and their institutional role is limited to formulating best practice suggestions with no enforcement powers, they will be reluctant to call attention to the flawed practices of individual Spectrum Management Authorities.

Returning to the question of *investment and innovation*, the statistically significant link between year of assignment of 800 MHz spectrum and current levels of LTE coverage is a clear indication that current arrangements are less than optimal.

There are many other aspects of European spectrum management policy that are ripe for some re-thinking, including licence durations and mechanisms for facilitating spectrum trading, but the foregoing is sufficient to make the point that *there is room for improvement in terms of the effectiveness of current arrangements*.

2.2.6.2 Efficiency

The efficiency of current arrangements relative to spectrum assignments has already been dealt with extensively in connection with effectiveness.

There is a general acknowledgement of the achievements in technical harmonisation. Technical harmonisation is considered as having worked well and that the involved actors (RSPG, RSC/CEPT and the Commission) have delivered. There is no indication of inefficiency at the moment in time.

The work of the RSPG is appreciated. There is the general perception that the RSPG has done good work according to its current scope. Public consultations on current topics inquiring of draft policy opinions are good tools to incorporate the view of industry stakeholders into the development and the refinement of the regulatory framework for radio spectrum. There is no indication of inefficiency at the moment in time.

What appears to be missing today, however, is an enhancement of the scope and tasks of the RSPG in order to allow it to improve European harmonisation of spectrum award procedures, timing of availability as well as licensing conditions for mobile broadband radio applications in the EU.

As regards the efficiency of the organisations that administer spectrum management, it is difficult to make concrete statements since the budgets and staffing of the organisations that manage spectrum are not separately broken out or itemised. In comparison to the economic value of the resource that is managed, and the complexity of the task, the staffing levels do not seem to a first order to be inappropriate.

2.2.6.3 Coherence

As we noted in Section 2.2.5.3.1, it is natural to ask whether there might not be a coherence problem between spectrum management policies that promote market entry versus competition policies that permit exit via merger. Our preliminary assessment is that the two mechanisms collectively maintain a dynamic balance, and that neither seems to be particularly flawed.

In this section, we explore other aspects of coherence.

2.2.6.3.1 Who grants individual rights of use?

With regard to the authorities in charge of assigning individual rights of use for radio frequencies (and the related supervision of compliance), the relevant Framework and Authorisation Directives refer sometimes to “competent national authorities”¹⁵⁹ or to “relevant authority”¹⁶⁰ and sometimes to “national regulatory authorities”.¹⁶¹ The concepts of “competent national authority” and “relevant authority” are defined in none of the Directives. Having multiple responsible authorities could create an organisational and transparency problem at national level for undertakings concerned, even if Article 15 of the Authorisation Directive foresees a mechanism in order to keep information regarding rights of use easily accessible, involving eventually the national regulatory authority.¹⁶² In the context of the 2015 Commission public consultation on the evaluation and review of the regulatory framework for electronic communications, mobile network operators claimed that inefficiencies and/or excessive costs of regulation may arise from several factors like the coexistence of authorities with overlapping or poorly coordinated tasks within the same Member State, e.g. in the field

¹⁵⁹ Art. 9(1), 1st subparagraph, 9(a)(1) and 9(b)(1) and (2) Framework Directive, ; Art. 5(2), 5th subparagraph and 5(6) Authorisation Directive, .

¹⁶⁰ Arts. 10(3), (4), (6) and 13(1) Authorisation Directive, . It should be noted that the French version of the Directives use in general the concept of “autorité compétente” for both, the English “competent” and “relevant”.

¹⁶¹ Art. 8(2), Framework Directive, ; Arts. 5(3) and 12(2), Authorisation Directive, . See also Arts. 10(1), (2) and (4) as well as 11(1) and (2) and 15 Authorisation Directive.

¹⁶² Rec. 34 Authorisation Directive.

of frequencies. Some argued that better coordination among different authorities in the same Member State is needed, that "... *there is far too much fragmentation in far too many areas*", and that "*harmonisation... should start with definitions and scope, and continue through implementation, provision of information, designation of 'competent authorities' etc.*".

The question also arises whether the use of different concepts allows Member States to entrust the relevant tasks to bodies not subject to the same requirements as 'national regulatory authorities', which are among other subject to specific requirements regarding independence and appeal against their decisions.¹⁶³ However, the Court of Justice has found that Member States may entrust bodies other than the national regulatory authority with tasks under the Directives,¹⁶⁴ provided that that other body "*satisfies the conditions of competence, independence, impartiality and transparency required by the Framework Directive and that the decisions which it takes can form the subject of an effective appeal to a body independent of the interested parties*".¹⁶⁵

It should finally be noted that the division of tasks between Member States and competent (or relevant) national authorities / national regulatory authorities regarding the assigning of individual rights of use for radio frequencies is not really clear cut¹⁶⁶ and could also be clarified.

2.2.6.3.2 Does the Authorisation Directive allow Member States to impose access obligations on operators outside the Article 7 procedure?

As noted in Section 2.2.2, Section B of the Annex to the Authorisation Directive lists exhaustively the conditions that Member States may attach to rights of use for radio frequencies. One of these - condition B.7 – allows for "*any commitments which the undertaking obtaining the usage right has made in the course of a competitive or comparative selection procedure*". On this basis, and using the very broad wording of the provision, several Member States (including the Czech Republic, France, Portugal and Spain) have imposed access obligations in favour of Mobile Virtual Network Operators (MVNOs) on mobile network operators without market assessment and SMP designation, and without application of the European consultation procedure foreseen by Articles 7 and 7(a) of the Framework Directive. Does clause B.7 constitute a '*lex specialis*' to Article 8 Access Directive and the related procedures of the Framework Directive with regard to the granting of individual rights of use for radio frequencies? The question deserves clarification, especially as the Annex to the Authorisation Directive specifies that the conditions it lists may be attached to rights of use "*within the limits allowed under Articles 5, 6, 7, 8 and 9 of Directive 2002/21/EC (the Framework*

¹⁶³ Resp. Arts. 3 and 4 Framework Directive,.

¹⁶⁴ At least regarding Art. 28 Universal Service Directive which was at issue in the proceeding.

¹⁶⁵ Case C-85/14 *KPN v. Autoriteit Consument en Markt (ACM)*, ECLI:EU:C:2015:668, para 58.

¹⁶⁶ Member States are competent for the granting of individual rights of use for radio frequencies – see Arts. 5(1), (2), 1st -4th subparagraph and (5), 6(4), 7 and 8 Authorisation Directive and Art. 4 Competition Directive, . National regulatory authorities or competent national/relevant authorities are also in charge with related tasks (see above).

Directive)". Note that Article 7(a) of the Framework Directive (which is closely linked to Article 7) is not mentioned.

2.2.6.3.3 Does the Competition Directive 2002/77/EC limit the scope of Article 7 Authorisation Directive?

Article 7 of the Authorisation Directive establishes a procedure for situations in which a Member State is considering whether to limit the number of rights of use to be granted for radio frequencies. The Member State shall among other considerations '*give due weight to the need to maximise benefits for users and to facilitate the development of competition*'. The provision continues to require the Member State to give interested parties the opportunity to comment, to invite applications for rights of use, and to publish its decisions. Paragraph 3 adds that Member States shall '*grant such rights on the basis of selection criteria which must be objective, transparent, non-discriminatory and proportionate*'. Article 7 submits decisions to limit rights of use only to procedural requirements. On the other hand, Article 4 of the Competition Directive prohibits in principle the granting of exclusive or special rights of use of radio frequencies. According to its Article 1(6), special rights means rights granted to a limited number of undertakings through an administrative instrument which designates or limits to two or more the number of such undertakings authorised to provide an electronic communications service or undertake an electronic communications activity, otherwise than according to objective, proportional and non-discriminatory criteria. This provision mirrors the requirements of Article 7 Authorisation Directive as regards the granting of spectrum rights of use, but adds an additional requirement: the limitation of the number of individual authorisations must also be based on objective criteria – such a spectrum scarcity – and be proportional and non-discriminatory.

The Authorisation Directive did not seek to derogate from Commission Directive 90/388/EEC as amended¹⁶⁷ that was in force at the time. Under Article 2(1) of the latter Directive, Member States had to withdraw "special rights which limit to two or more the number of undertakings authorised to provide such electronic communications services or to establish or provide such networks, otherwise than according to objective, proportional and non-discriminatory criteria". This requirement flows directly from Article 106 in combination with Articles 56 and 102 TFEU¹⁶⁸ and did not need to be repeated

¹⁶⁷ Commission Directive 90/388/EEC of 28 June 1990 on competition in the markets for telecommunications services, [1990] OJ L192/10.

¹⁶⁸ "According to the case-law of the Court of Justice, Article 82 EC in conjunction with Article 86(1) EC are infringed whenever a State measure granting preferential rights (to a public undertaking or an undertaking already holding special or exclusive rights) creates inequality of opportunity between economic operators and allows the undertaking in a dominant position to distort competition by the mere exercise of those rights, for example, by maintaining or extending its dominant position to a downstream market, thereby restricting the access of potential competitors, without there being any need to prove specific conduct constituting abuse within the meaning of Article 82 EC' see Opinion of A.G. Wathelet in Case C-553/12 P Commission v. Dimosia Epicheirisi Ilektrismou (DEI), ECLI:EU:C:2013:807, para 61.

in secondary legislation. To date, however, the Court of Justice has had no opportunity to confirm this interpretation.¹⁶⁹

2.2.6.4 Relevance

There is no question that the regulatory framework continues to be highly relevant for spectrum management. The radio spectrum is a scarce resource that must be managed to ensure an efficient usage of spectrum. The instruments in place are well suited to their intended purpose.

In particular, there is no doubt that individual spectrum user rights should be granted with a view to avoid harmful interference, to ensure the technical quality of service, to safeguard an efficient use of spectrum, or to fulfil other general interest objectives defined by EU countries in line with Article 5(1) of the Authorisation Directive.

Market mechanisms for spectrum usage allow for a more efficient usage of spectrum. Spectrum trading and leasing as established by Article 9(b) of the Framework Directive or administrative incentive pricing under Article 13 AuD in conjunction with Article 8(2) according to which NRAs should, inter alia use spectrum fee structures that provide incentives for efficient spectrum usage so as to ensure the optimal use of these resources also continue to be of relevance.

Efficient usage of spectrum is also promoted by allowing for a technical neutral usage as called for in Article 8(1) second paragraph and Article 9(3) and (4) of the Framework Directive, which thus continues to be relevant.

High level principles such as the requirement for assignment procedures to be objective, transparent, non-discriminatory or proportionate as laid down in Article 7(4) are still relevant. At the same time, our evidence base suggests that more stringent requirements are needed.

Spectrum sharing as allowed for under Article 9(b) FWD may become even more relevant with the evolution of 5G.

2.2.6.5 EU value added

It is clear that there is EU value added. Cross-border interference, for instance, is sometimes addressed bilaterally, but there is clear advantage in overall strategic planning at European level. In terms of interoperability and the availability of services, a European role has clear merit. Indeed, the question is not whether a smaller role might

¹⁶⁹ A recent case concerning rights of use of spectrum was adjudicated on the basis of another provision of the Competition Directive: see Case C-376/13 *Commission v. Bulgaria*, ECLI:EU:C:2015:266.

be possible, but rather whether a larger European role is required, and if so how should it be put in place.

Technical harmonisation, the promotion of frequency trading, reasonable spectrum fees, transparent, and objective and non-discriminatory assignment procedures are essential for European spectrum management in the interest of the European citizens and the establishment of a single internal market. The RFEC with regard to spectrum management serves as an indispensable guideline for the European Member states in the interest of the European and the establishment of a single internal market. CEPT/RCS/RSPG/BEREC European institutions established by the European Framework are indispensable to ensure technical harmonisation and in the future probably to ensure consistent and harmonised spectrum assignment procedures.

2.2.6.6 Conclusions

In terms of *effectiveness*, current spectrum management arrangements have enabled competition for ECS. As regards efficient allocation of scarce spectrum resources, current arrangements demonstrate many elements of strength, but also some weaknesses. Delays in assignment of 800 MHz and 2.6 GHz spectrum can be viewed for instance as being failures not only in terms of investment and innovation, but also in terms of the effectiveness of management of this scarce resource. As regards maintenance of consistent practice in the interest of single market, spectrum management practices and outcomes are in a number of respects not only divergent among the Member States, but on occasion and in certain respects are clearly flawed. This is partly a consequence of institutional arrangements where Member State decisions can sometimes be taken by agencies that are subject to governmental interests unrelated to spectrum management, and by the absence of independent and objective external review.

Efficiency has two dimensions: efficiency of use of the spectrum as a shared resource, versus efficiency of institutional arrangements. Since efficient management of spectrum is an explicit objective, it is already addressed as an effectiveness concern. As regards the efficiency of institutional arrangements, current arrangements appear to be reasonably efficient, although there might be concerns regarding fragmentation of spectrum management responsibilities in certain Member States.

The arrangements are generally *coherent* with other aspects of the RFEC, and with other EU policies. Concerns can however be raised about the coherence of imposition of obligations through a spectrum assignment process that otherwise could not be imposed on undertakings that do not possess significant market power (SMP).

There is no question that the regulatory framework for spectrum management continues to be highly *relevant*. The radio spectrum is a scarce resource that must be managed to

ensure an efficient usage of spectrum. The instruments in place are generally well suited to their intended purpose.

As regards *EU added value*, an EU role is indispensable in order to achieve interoperability, the availability of services, and the avoidance of cross-border interference. The Member States alone could not achieve this. A European role in spectrum management is in the interest of the European citizens, and contributes to the maintenance of a single internal market.

2.3 Access to scarce resources – numbers

The Section is structured as follows:

- Section 2.3.1 summarises the key technological and commercial trends relevant for spectrum.
- Section 2.3.2 describes key provisions regarding access to spectrum.
- Section 2.3.3 looks at institutional functioning.
- Section 2.3.4 assesses the implementation of the framework provisions with regard to numbers.
- Section 2.3.5 summarises stakeholder views.
- Section 2.3.6 analyses subsequent outcomes and problems.
- Section 2.3.7 assesses the performance of the provisions.

2.3.1 Key technological and commercial developments regarding numbering

Changing demand behaviour and technological progress in the electronic communications markets have led to the development of new business models and to a stronger internationalisation of electronic communications networks. These new business models, such as M2M services, change the demand for numbering resources and are challenging national regulatory authorities worldwide with the task of adapting the existing numbering management.

Several new business models (e.g. VoIP services, connected cars [including cars equipped with eCall capability, where the emergency number 112 would be automatically dialled in the event of a serious accident], and smart meters) affect the numbers that are used for the identification of (mobile) subscribers.

The numbers that are relevant here are geographic telephone numbers (fixed and mobile wireless numbers), which are governed by ITU Recommendation E.164, as well as technical IMSI numbers, which are governed by ITU Recommendation E.212.

2.3.1.1 M2M developments

In global industry sectors such as the automotive sector, Machine-to-Machine (M2M) communication becomes increasingly important to control and monitor high-quality consumer and capital goods. While about 8% of global mobile terminals are used for M2M communication in 2015 (18.5% in Western Europe¹⁷⁰), this is expected to rise to 26% in 2020 (51.1% in Western Europe¹⁷¹), as is visible in Figure 16. In comparison, while smartphones globally accounted for 32% of mobile devices in 2015 (50.2% in Western Europe), they are expected to account for an even greater share in 2020 with 40% (39.4% in Western Europe). Even so, however, the growth rate in the number of smartphones will be less strong than that of M2M devices. M2M growth rates in terms of the number of devices are expected to be many times higher than those used for pure voice communication.¹⁷² The number of global M2M connections is expected to increase from 495 million in 2014¹⁷³ to more than 3 billion in 2020,¹⁷⁴ a sevenfold growth. Globally, the expected growth in the total number of mobile devices from 2015 to 2020 corresponds to a *compound annual growth rate (CAGR)* of 8%, while the expected growth in the total number of M2M mobile devices from 2015 to 2020 corresponds to a CAGR of 38%.

¹⁷⁰ http://www.cisco.com/c/dam/assets/sol/sp/vni/forecast_highlights_mobile/index.html.

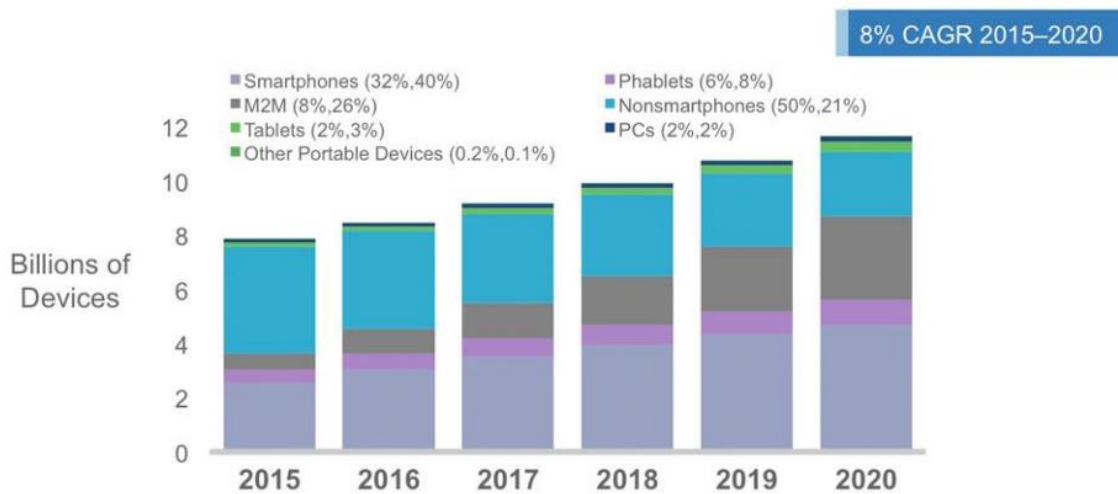
¹⁷¹ http://www.cisco.com/c/dam/assets/sol/sp/vni/forecast_highlights_mobile/index.html.

¹⁷² Cisco (2016), Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2015–2020, (Cisco VNI Mobile 2016), White paper published 3 February 2016. p.7.

¹⁷³ Cisco (2015), Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2014-2019, (Cisco VNI Mobile 2015), White paper published 3 February 2015., p. 13

¹⁷⁴ *Ibid*, p. 16.

Figure 16: Global mobile devices and connections growth, 2015-20



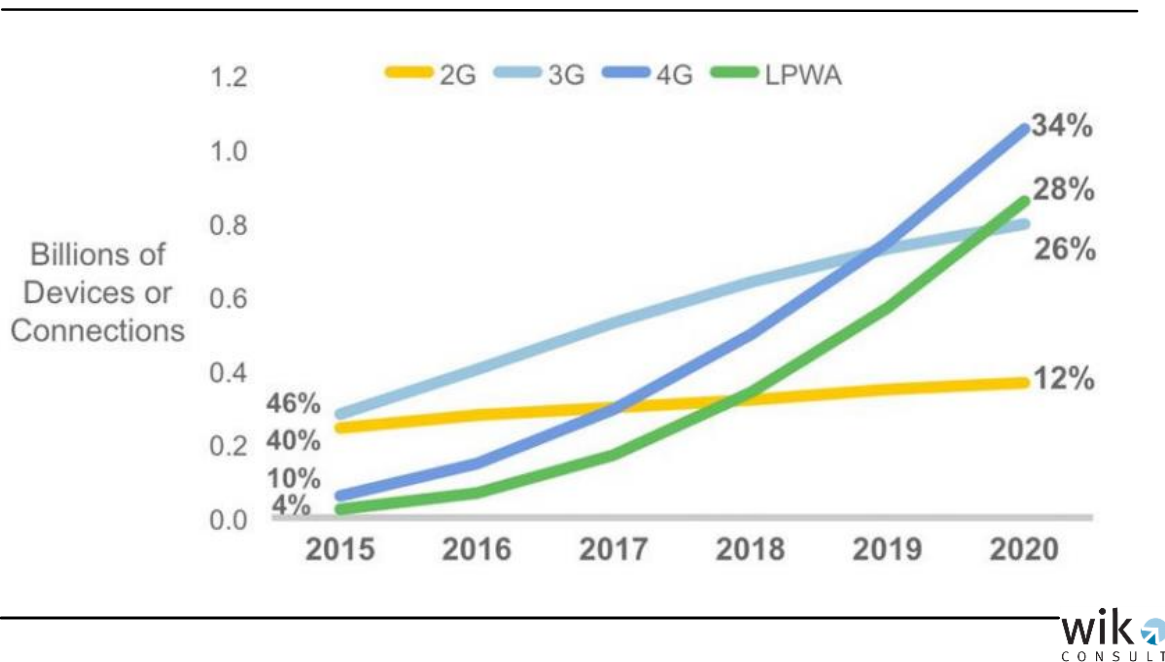
Source: Cisco VNI Mobile (2016)

Meanwhile, there is a steady shift of M2M to progressively more advanced mobile network architecture. The use of *Low-Power Wide-Area (LPWA)* networks for M2M and the mobile Internet of Things (IoT) is expected to become important, albeit more so in some regions of the world than in others (see Figure 17).¹⁷⁵ LPWA, which was standardised by the 3GPP late in 2016, is expected to enable IoT devices to offer low power consumption, low unit cost, improved indoor and outdoor signal penetration, and secure connectivity in comparison with solutions that have been available to date.¹⁷⁶

¹⁷⁵ Cisco (2016), Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2015–2020, (Cisco VNI Mobile 2016), White paper published 3 February 2016, p. 9.

¹⁷⁶ GSMA (2016), 3GPP Low Power Wide Area Technologies.

Figure 17: Global M2M growth and migration from 2G to 3G, 4G, and LPWA, 2015 - 2020



Source: Cisco VNI Mobile (2016).

The main identifiers currently used for M2M applications in public networks are E.164 and E.212 (IMSI) numbers. These classical telecommunications numbers (E.164 and E.212) will continue to be the main solution to identify M2M entities in the short and medium term, while the use of IPv6 addresses might possibly become the preferred solution in the long term.¹⁷⁷ Current numbering issues that concern NRAs with respect to M2M services include (1) number scarcity with regard to mobile network codes (MNCs), (2) extra-territorial use of E.164 numbers, and (3) possible rapid consumption of E.164 numbers.

2.3.1.1.1 Increasing demand for MNCs

MNCs (a portion of the E.212 IMSI) could represent a bottleneck. Two digit MNCs are assigned in most European countries. This means that a maximum of 100 MNCs per country or per mobile country code (MCC) can be assigned. While this capacity is usually sufficient for existing mobile services, the development of M2M and the additional demand for IMSI numbers could lead to number scarcity in the near future.

M2M communication often makes use of mobile networks. Based on the potential development and growth of M2M, it is possible that the demand for MNCs might rise

¹⁷⁷ See also BEREC (2015), BEREC Opinion on the Review of the EU Electronic Communications Regulatory Framework, BoR (15) 206.

sharply in the future. The existing framework regarding the allocation of MNCs in many European countries might lead to a shortage of MNCs in the near future.

The utilisation rate of MNCs is not greater than 50% in European Member States, with the sole exception of Belgium.¹⁷⁸ This is due to the fact that the M2M industry is still developing. In addition, the allocation rules in most countries, developed by national regulatory authorities, typically do not allow for an assignment of MNCs to market participants that are not electronic communications providers.

In the majority of the EU Member States, as we explain at greater length in Section 2.3.4.3, only Mobile Network Operators (MNOs) and full MVNOs or MVNOs with at least a modicum of infrastructure of their own (such as own their own Home Location Register (HLR)) are eligible to apply an for MNC. Exceptions are Croatia, Cyprus and Latvia, where the NRA only makes a direct allocation of MNCs to MNOs (although MVNOs are still able to obtain MNCs in an indirect way by asking their MNO partners). Eleven out of 28 Member States (Bulgaria, Hungary, Ireland, Italy, Luxemburg, the Netherlands, Poland, Portugal, Romania, Spain and Sweden) allow the assignment of MNCs to providers of non-mobile services, an example being *fixed-line SMS services* that enable SMS messages to be sent or received to or from certain devices other than conventional mobile devices.

2.3.1.1.2 Extra-territorial use of E.164 numbers

M2M operators seeking to offer their services across borders today typically cooperate with mobile phone companies that can provide an international communication network for M2M applications by means of existing international mobile roaming agreements. Mobile operators such as Vodafone have substantial international coverage; however, since no MNO has worldwide coverage, they must use their roaming agreements and alliances in order to offer M2M customers so-called all-in-one solutions with Europe-wide or global coverage.¹⁷⁹

From the point of view of a provider of M2M services, the benefits of an all-in-one solution may be offset somewhat by the disadvantages of a certain level of dependence on a specific mobile network operator. M2M providers who want to offer global services are not able to switch mobile operators without incurring high costs due to operator lock-in effects.¹⁸⁰

¹⁷⁸ See Figure 26.

¹⁷⁹ M2M World Alliance, Global M2M Association and Bridge M2M Alliance are three of the largest Alliances in this regard.

¹⁸⁰ For example, if a machine to machine (M2M) customer changes operator, the SIM cards must be physically replaced in each M2M device. This might be prohibitively costly and logistically impractical in situations where there are a large number of M2M devices installed over a wide geographic area. If it becomes possible to download SIM card characteristics over the air in the future (i.e. eSIM, which is described elsewhere in this section), these effects might be ameliorated.

Another concern relates to international roaming charges, which could have a negative impact on the development and growth of M2M services.

These developments have triggered a debate about the possibility of an extra-territorial use of E.164 numbers.¹⁸¹ It should be noted that while E.164 numbers are routinely used outside of the issuing country on a *temporary* basis (notably for *international mobile roaming*), they are generally not designed for *permanent* extra-territorial use.

In the case of *connected cars*, one can readily imagine the need for extra-territorial use of E.164 numbers in order for services to be offered across borders on a permanent basis.¹⁸² An extra-territorial use of E.164 numbers might also provide cost advantages to M2M suppliers. It would tend to imply less administrative burden for M2M operators, inasmuch as they would only have to apply for numbers in one country, and would pay a fee for the numbers only once while serving customers in many countries. M2M operators could provide services in different countries using one number range coming from one national numbering plan.

One might well imagine that the new *Roam Like at Home (RLAH)* aspects of the Open Internet Regulation 2015/2120 might facilitate long term extraterritorial use; however, the *Fair Use Limits (FULs)* that are intended to prevent permanent roaming (i.e. subscribing in a low cost country and then using the subscription in the high cost country where one lives) might get in the way.

Some experts argue that the disadvantages or obstacles to the extra-territorial use of E.164 numbers predominate. There are arguments for and against this view (see Section 2.3.6.1, which discusses CEPT recommendations on extra-territorial use of E.164 numbers).

2.3.1.1.3 Increased demand for E.164 numbers

It is also possible that increased prevalence of M2M services will put pressure on the numbering plan for conventional E.164 numbers. For two reasons, this does not necessarily pose a severe constraint. First, it is not the case that every M2M device going forward actually needs an E.164 number. Second, it does not seem to be problematic to expand the E.164 number space in countries that experience shortages, possibly with M2M-specific numbers.

2.3.1.2 eCall

eCall is an EU initiative intended to bring rapid assistance to motorists involved in a collision anywhere in the EU. Because of its mandatory character (eCall is not optional

¹⁸¹ CEPT (2013), Extra-territorial use of E.164 numbers, ECC Report 194.

¹⁸² This is also an issue for eCall services, which can be viewed as a special case of connected cars.

and will be mandated through amendments to directives), and because of its planned introduction date by April 2018, some stakeholders have argued that eCall might pose a challenge to the EU numbering systems (especially IMSI numbers) in the near future.¹⁸³

eCall cannot be considered to be a commercially viable separate business model. The eCall functionality in itself is profitable neither for the vehicle manufacturer nor for the network operator. eCall will be implemented because it is mandatory. An "eCall only" solution (i.e. the installation of an eSIM module in the vehicle solely to enable eCall) can therefore probably be expected only for low-priced vehicles. eCall is however seen as a driver for the *connected car*, where it will be implemented together with several other M2M features (e.g. concierge services) on the same eSIM module.

Concerns that eCall might cause number exhaustion are not shared by all. Notably, the German NRA (BNetzA) does not expect eCall to cause number exhaustion problems. Their expert opinion carries particular weight not only because they represent one of the larger countries in Europe, but also because the car industry plays an important role in Germany.

Some aspects that argue against numbering shortage due to eCall:

- According to Article 7 of the Regulation (EU) 2015/758,¹⁸⁴ eCall will be mandatory only for new vehicle registrations in the EU from 2018, not for all vehicles.
- Technically, eCall will be implemented by established M2M platforms, which are in general active globally and therefore often also use IMSIs from the international ITU numbering range ("MCC 901").
- The possible introduction of eSIM might also help to guard against a potential shortage of IMSI numbers.

The relationship of eCall to extra-territorial use of E.164 numbers entails complex interdependencies. The eCall capability exists in order to place calls or send SMS messages to the emergency number "112". It is not clear that human users would ever place a call to an eCall-only system; moreover, roaming charges play little role for eCall within the EU/EEA, since calls to "112" must be free of charge.¹⁸⁵ Thus, eCall in and of itself may not drive requirements for extra-territorial use of E.164 numbers; however, to

¹⁸³ ECO (2016), eCall – A case study on the numbering requirements, presentation by McBride of ECO at the CEPT M2M Workshop in Mainz, 21 March 2016.

¹⁸⁴ Regulation (EU) 2015/758 of the European Parliament and the Council of 29 April 2015 concerning type-approval requirements for the deployment of the eCall in-vehicle system based on the 112 service and amending Directive 2007/46/EC, [2015] OJ L123/77.

¹⁸⁵ Universal Service Directive, Arts. 6 and 26.

the extent that eCall drives use that is integrated with a wider range of connected car capabilities, it might accelerate the need for extra-territorial use of E.164 numbers.

2.3.1.3 eSIM

Alternative SIM solutions have recently been deployed that improve on the traditional SIM card approach (a removable SIM card issued by a single operator), especially for M2M devices and tablets. One of these solutions is the so called Embedded SIM (eUICC – embedded Universal Integrated Circuit Card), which is fixed in the device and allows remote provisioning and management. For several years, the industry has been working on a common standard for eSIMs. The *European Telecommunications Standards Institute (ETSI)* began the development of a worldwide standard for eSIM, publishing the results of their work in February 2013. By the end of 2013, the GSMA had adopted common technical standards for eSIM.¹⁸⁶ Through the use of eSIM based on common standards, not only is the process of switching operators simplified (by uploading a new operator profile including a new IMSI number), but also extra-territorial use (by eliminating international roaming fees, assuming that that eSIM is associated with a number in the Visited Country).

In light of these advantages, the use of eSIM is expected to grow in the coming years (see Figure 18). Further, a study on behalf of the GSMA estimates that the implementation of eSIMs could potentially drive additional growth of M2M of 30% by 2020.¹⁸⁷

¹⁸⁶ Beechham Research (2014), Benefits Analysis of GSMA Embedded SIM Specification on the Mobile Enabled M2M Industry, p. 1.

¹⁸⁷ *Ibid* p. 9.

Figure 18: Overall M2M connections forecast, GSMA embedded SIM specification vs proprietary SIM, 2013 - 2020



Source: Beecham Research (2014), Benefits Analysis of GSMA Embedded SIM Specification on the Mobile Enabled M2M Industry.

The use of eSIM potentially enables a more efficient use of E.212 numbers, whereby an increased demand for E.212 numbers could be handled in the future under existing regulations. It is also claimed that the use of eSIM simplifies international deployment of M2M applications. For M2M market segments such as connected cars, cross-border use of M2M applications with numbers specific to the Visited Country might be possible, which might reduce costs significantly. As previously noted, whether this consideration will still be meaningful within the EU/EEA after the roaming provisions of Open Internet Regulation take full effect remains to be seen. Further, it is still a globally relevant consideration.

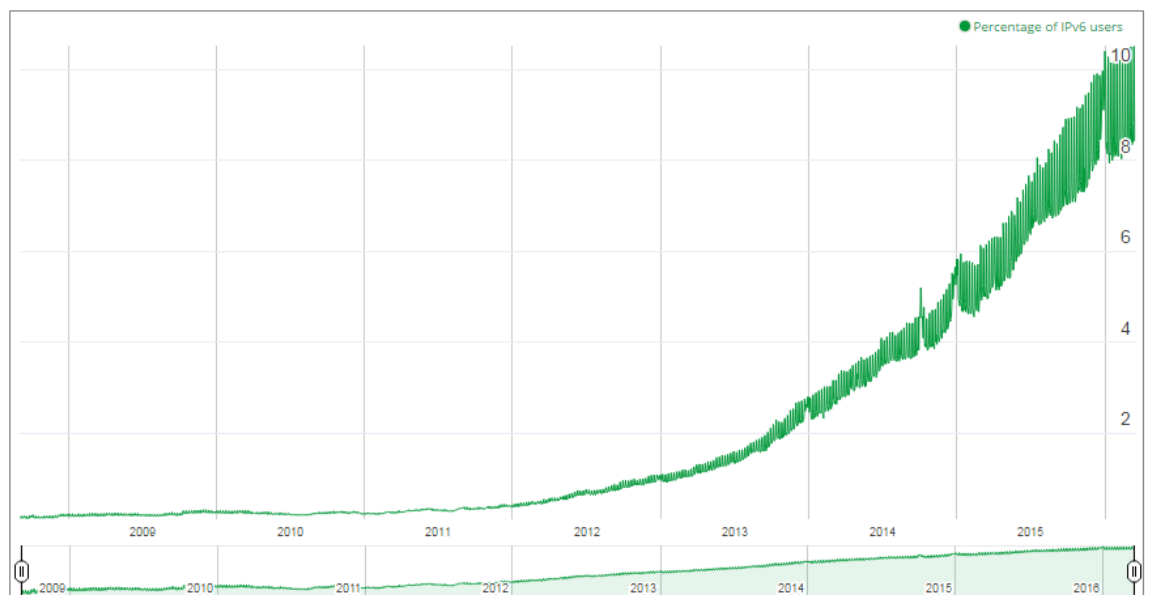
2.3.1.4 IPv6

M2M devices are usually equipped with a communication module, whereby the communication module can either be a SIM card, a wireless connection, or an Ethernet connection. Today, a mobile protocol associated with an E.164 number and a SIM card is often used; however, a wireless LAN connection (for instance) that provides similar functionality requires neither a SIM card nor an E.164 number.

There would still be a need for an IP address. The current *Internet Protocol Version 4 (IPv4)* address space is nearly exhausted; however, the successor *Internet Protocol Version 6 (IPv6)* is in principle available (even if it has been exceedingly slow to deploy, as we explain shortly). IPv6 could represent an alternative numbering resource for M2M communication in the medium to long term.

Diffusion of this protocol has been slow. According the OECD, the worldwide traffic over IPv6 stood at roughly 3.5% as of April 2014.¹⁸⁸ Google estimated the global share of its users that reach Google via IPv6 to lie around 5.0% in January 2015 and around 10% in January 2016.¹⁸⁹ Similar figures are published by Cisco regarding its worldwide users connecting via IPv6.¹⁹⁰

Figure 19: Cisco share of IPv6 users, 1Q/2009-1Q/2016



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Source: Cisco 6lab, <http://6lab.cisco.com/stats/cible.php?country=world&option=prefixes> (20.02.2016)

¹⁸⁸ OECD (2014), *The Economics of Transition to Internet Protocol version 6 (IPv6)*, p. 4.

¹⁸⁹ Google (2016, „IPv6 Statistics; see “IPv6 Adoption” and „Per-country IPv6 Adoption” (<http://www.google.com/intl/en/ipv6/statistics.html#tab=per-country-ipv6-adoption>).

¹⁹⁰ Cisco 6 lab, *Global IPv6 adoption (2016)* (<http://6lab.cisco.com/stats/cible.php?country=world&option=prefixes>).

The slow deployment of IPv6 is possibly irrelevant in terms of use of IPv6, since M2M usage generally reflects closed communities of devices, and does not necessarily require global reachability to other end systems. It would however be necessary for the routing infrastructure carrying M2M IPv6 datagrams to be able to correctly route them.

2.3.1.5 The European Telephony Numbering Space (ETNS)

The history of the *European Telephony Numbering Space (ETNS)* provides an instructive case study as regards European numbering policy.

Article 27 of the Universal Service Directive calls for a European Telephony Numbering Space (ETNS), which was to be based on the telephony country code of “3883” that had been assigned for this purpose by the International Telecommunications Union (ITU). This service never became fully operative, and has lain completely dormant for the past several years. The ITU country code has been withdrawn.

The roots of ETNS can perhaps be best understood based on the Commission’s 1996 Green Paper.¹⁹¹ The Green Paper was part and parcel of the overall liberalisation of the sector in an era where most national networks had not yet been privatised, where voice telephony was central to electronic communications, and where the Internet played a much smaller role than it does today. The Green paper was heavily concerned with establishing a common, comprehensive, coherent overall numbering strategy for Europe that would enable common access codes for pan-European services (such as freephone, shared cost, premium rate or mobile network services). Part and parcel of the plan were measures to enable carrier selection and number portability in support of effective electronic communications competition.

Enabling new services was a goal, but promoting a unique European identity (as distinct from national / Member State identity) was clearly also a central goal.

The analysis in Annex I of the Green Paper has the flavour of an enormously simplified Impact Assessment under current Commission Guidelines. Four Options were considered, which could be characterised as:

- Option 1: A “business as usual” Option;
- Option 2: A European Telephony Numbering Space (ETNS) for special pan-European services such as freephone, premium rate or shared cost services without making changes to country codes;
- Option 3: A plan to create a consistent set of three-digit country codes for European countries (e.g. 332 for Belgium); and

¹⁹¹ European Commission (1996), Towards a European Numbering Environment: Green Paper: On a Numbering Policy for Telecommunications Services In Europe, COM(96) 590, 20 November 1996.

- Option 4: A plan to establish a single digit country code for Europe linked to an open and unified European numbering scheme with which national schemes would gradually be fully integrated.

The Green Paper clearly signals the Commission's preference for Options 3 and 4, which could be viewed as the more adventurous Options. The Green Paper notes for instance that Option 3 could have:

- provided the medium-term ability to manage country code resources at the European level (independently from the ITU);
- given Europe a clear numbering identity ("3"), comparable with the "1" found in the North American Numbering Plan (NANP); and
- freed existing service codes.

According to the Green Paper, several studies had identified demand for the relevant services: "Studies have suggested that there is strong latent demand for special Europe-wide services, such as freephone, premium rate or shared-cost services, even though their development until now has been held back by the absence of a common numbering approach, as well as by cultural and linguistic factors. This contrasts with the phenomenal success of freephone services in the USA, where portability of freephone numbers both between different locations and between different operators has been required."¹⁹² The Green Paper also claimed that, costs notwithstanding, a "unified European numbering plan should improve the efficiency of European operators and service providers and offer certain scale economies".

The Green Paper also claims that Option 1 was widely rejected. "Incumbents tended to take a more conservative view, favouring only Option 2, whilst new entrants, service providers, users and manufacturers generally stressed the strong desirability for opening up the numbering environment in Europe ..."

In 1997, 24 countries (not all of which were Member States) jointly applied for country code +388¹⁹³ in support of (1) Corporate networks; (2) Televoting; (3) Telemarketing and customer services; (4) Audiotex and information services; (5) Calling card services; (6) Messaging services; and (7) Radio-paging.¹⁹⁴

¹⁹² Studies identified in the Green Paper and in subsequent work for the Commission are an Ovum study from 1991-92; Sagatel (1996), *The Harmonised European Telephone Services Market: The Economic Stakes and the Need for Numbering Solutions*; and O'Loughlin and Sharrock (1994), *Potential Opportunities Afforded by a New European Telephony Numbering Space*. None of these papers appear to be readily available today.

¹⁹³ In the end, ITU TSB assigned only the +3883 subset of the requested code.

¹⁹⁴ The information that follows about ETNS is based on a 2009 study for the European Commission. See Carter, K.R., D. Elixmann and J. Horrocks (2009), *Study on options for the future of ETNS (European Telephone Numbering Space), Final report*.

The request explicitly stated that “the applications will not include services provided at the global level.” This omission is noteworthy – the expectation of demand for the service had in large measure been based on Freephone services. A European Freephone service would likely not have been approved by the ITU, since it would have been viewed as inappropriately conflicting with (or competing with) the already defined global Freephone service. It is perhaps not surprising that demand for the seven services for which the application was in fact made did not subsequently prove to be overwhelming.

The ITU authorised +3883 (a subset of the code requested) on 10 April 2000. Standards work began apace. A company (Neustar) was appointed to administer a database of numbers. A legal basis for ETNS was established in Article 27 of the Universal Service Directive as enacted in 2002.¹⁹⁵

Actual deployment by network operators was, however, extremely limited. At the time of a 2009 study for the Commission, 60,105 numbers were assigned, six of which were allocated to network operators in six blocks of 10,000 numbers; hardly any, however, were in use. Only one organisation, VoIPgate, was attempting to actually use the numbers.

In November 2006, the Director of ITU TSB wrote to the 24 countries who were assigned code +3883 requesting detailed information on actual implementation of the code. There were irregularities in the delegation of code +3883; the numbers were not being used for the purposes originally specified; the level of use was very low; and access had not been achieved from many countries. In subsequent discussions at ITU Study Group in November 2007, only three of the countries that had originally applied for the code continued to show strong interest, and only one service provider was in operation.

The ERO then sent a questionnaire to all 24 applicant countries. The report of the results notes that, although 23 of the countries proposed to retain the code, “the replies could be interpreted in a way that countries do not wish to stand against the European Commission's view, that is clearly given via the Communications Committee: ‘The COCOM position (COCOM07-48) on the ETNS: “...For as long as there are provisions regarding ETNS in Community law, those Member States who are also assignees of the 3883 code should take all necessary measures to ensure that 3883 is not reclaimed by the ITU. These Member States are strongly invited to adopt a firm common position in favour of retaining the code 3883 in the ITU SG2 meeting.’ As a conclusion, although there seems to be very little or no commercial interest on the ETNS, the clear majority of the ETNS assignee countries wish to keep the status quo.”

¹⁹⁵ *Ibid.*

The May 2008 meeting of the ITU-T Study Group 2 decided by consensus to suggest to ITU reclaim the ETNS code +3883. The ITU then wrote to each of the 24 Administrations in June 2008 reclaiming the code with effect from 31 December 2010.

Meanwhile, the review of the RFEC that concluded in 2009 included a slightly expanded Article 27.¹⁹⁶ In terms of the European political process, this appears to demonstrate continued support for telephone numbers that indicate a European identity.

This lengthy episode raises numerous questions, many of which cannot be answered conclusively today, but the questions are nonetheless worth considering. One set of questions relates to demand for ETNS services; the other, to issues of institutional design.

As regards demand for ETNS services, the historical record cannot be said to demonstrate much demand; however, the historical record is in important respects inconclusive. First, as previously noted, an ETNS service supporting only the services applied for (and explicitly excluding Freephone services) could hardly have been expected to generate much interest on the part of businesses. Second, the service would only have been of interest once it was fully usable in a large number of Member States. Since it never achieved much deployment, it never generated much interest – a classic “chicken and egg” problem.

In other words, the fact that ETNS as initially designed never successfully got off the ground does not necessarily mean that a better designed and better thought through system offering a European telephone number identity might not be workable.

The history also raises numerous questions of institutional design. It is noteworthy that neither the Commission nor any other European institution was a party to the initial application for the +3883 code to the ITU; instead, the application was made by 24 countries, many of which were not even EU Member States. Subsequently, the discussion of maintenance or withdrawal of the +3883 country code (a discussion that was in principle between the Commission and the ITU) was handled in practice by means of COCOM directions to the 24 applicant countries. As we explain in Section 2.3.2, the RFEC provides the Commission with extensive capabilities to coordinate numbering policy among the Member States, but few explicit tools for coordinating European positions with international bodies with respect to numbering. It is striking that the Commission’s prerogatives in dealing with the ITU and CEPT for spectrum management, as expressed in Article 4 of the Radio Spectrum Decision, are

196 Paras 2 and 3 are relevant. “2. A legal entity, established within the Community and designated by the Commission, shall have sole responsibility for the management, including number assignment, and promotion of the European Telephony Numbering Space (ETNS). The Commission shall adopt the necessary implementing rules. 3. Member States shall ensure that all undertakings that provide publicly available telephone services allowing international calls handle all calls to and from the ETNS at rates similar to those applied for calls to and from other Member States.”

far broader than the Commission's prerogatives in dealing with the ITU and CEPT for numbering.

2.3.1.6 Preliminary conclusions

New business models in the M2M industry are changing the demand for E.212 numbers and E.164 numbers.

Internationally established M2M providers want to offer their services simultaneously in multiple countries. The equipment must be able to move flexibly across Member State borders (especially in the case of connected cars). With regard to E.164 numbers, extra-territorial use of the numbers is thus at the forefront of current discussions.

In addition, due to the growth of the M2M market, a bottleneck with regard to E.212 MNCs might be expected in some countries.

2.3.2 Key framework provisions regarding access to numbers

Under Article 10(1) of the Framework Directive, Member States must ensure that adequate numbers and numbering ranges are provided for all publicly available electronic communications services. National regulatory authorities must establish objective, transparent and non-discriminatory procedures for granting rights of use for national numbering resources. Under Article 5(2) of the Authorisation Directive, Member States must grant rights of use of numbers upon request to any undertaking authorised for the provision of electronic communications networks or services, subject to rules ensuring the efficient use of those resources in accordance with the Framework Directive.

Under Article 5(3) of the Authorisation Directive, decisions on applications for the right to use numbers must, except when granting the right of use of numbers with exceptional economic value, be taken, communicated and made public within three weeks after the complete application has been received by the National Regulatory Authority. A longer period of six weeks is allowed by Article 5(4) for numbers of exceptional economic value.

While the Directives do not stipulate what type of numbers are to be granted, Member States have been encouraged to give any undertaking providing or using electronic communication networks or services that applies for them access to geographic numbers.¹⁹⁷ *“Offering geographic numbers can be a very important element in the business proposal of a publicly available ECS provider to its prospective clients; this could be linked to the importance attached by users to having a geographic number, or*

¹⁹⁷ European Commission (2004), Treatment of Voice over Internet Protocol (VoIP) under the EU Regulatory Framework. Staff Working Document, p. 19.

to tariff structures that favour calls to geographic numbers".¹⁹⁸ Undertakings may alternatively apply for non-geographic numbers.

In the Directives, rights to numbers may also be allocated from a European Numbering Plan, including for example the virtual country code +3883.¹⁹⁹ There has however been negligible commercial interest in these numbers; consequently, the ITU reclaimed the +3883 code circa 2011. These provisions are effectively inoperative today (see Section 2.3.1.5).

National Regulatory Authorities can attach specific conditions to the rights of use of numbers listed exhaustively in Annex C of the Authorisation Directive, i.e.:

1. Designation of service for which the number shall be used, including any requirements linked to the provision of that service.
2. Effective and efficient use of numbers in conformity with Directive 2002/21/EC (Framework Directive).
3. Number portability requirements in conformity with Directive 2002/22/EC (Universal Service Directive).
4. Obligation to provide public directory subscriber information for the purposes of Articles 5 and 25 of Directive 2002/22/EC (Universal Service Directive).
5. Maximum duration in conformity with Article 5 of this Directive, subject to any changes in the national numbering plan.
6. Transfer of rights at the initiative of the right holder and conditions for such transfer in conformity with Directive 2002/21/EC (Framework Directive).
7. Usage fees in accordance with Article 13 of this Directive.
8. Any commitments which the undertaking obtaining the usage right has made in the course of a competitive or comparative selection procedure.
9. Obligations under relevant international agreements relating to the use of numbers.

Where Member States determine that the numbers in a given number range are limited, they are obliged to distribute those numbers in an objective, transparent and non-

¹⁹⁸ Geographically distinct telephone zones were introduced in the 20th century as a technical measure to facilitate hardware-based call routing, and de-facto became a mechanism for operators to differentiate retail tariffs (between local and longer distance calls). With network digitisation, the physical and logical architecture of networks has changed. However, in most EU countries, the distinction between geographic and non-geographic numbers has been maintained.

¹⁹⁹ Authorisation Directive, rec 11.

discriminatory matter. Member States must avoid discriminating between providers as regards the numbering used.²⁰⁰ *"This could for instance be the case if a new undertaking were to receive non-geographic numbers, while its competitors had received geographic numbers; this could result in end-users assuming, whether justified or not, that they would have to pay higher interconnect prices when calling customers of the provider that has only non-geographic numbers. Failure to assign suitable numbers, or undue delays in assignment of numbers, could constitute discrimination".*^{201 202}

Numerous provisions relate explicitly or implicitly to the ability of the Commission to coordinate numbering policy among the Member States; few, however, empower it in dealing with international organisations such as the CEPT and the ITU.

- Under Article 10(4) of the Framework Directive, for instance, "Member States shall support the harmonisation of specific numbers or numbering ranges within the Community where it promotes both the functioning of the internal market and the development of pan-European services. The Commission may take appropriate technical implementing measures on this matter."²⁰³
- Likewise, the powers conferred under Article 19 of the Framework Directive (harmonisation procedures) are considerable where the Commission finds divergent implementation. The Commission can *"issue a recommendation or a decision on the harmonised application of the provisions in [the Framework] Directive and the Specific Directives"* but only for limited matters, one of which however is *"numbering, including number ranges, portability of numbers and identifiers, number and address translation systems, and access to 112 emergency services"*.
- Article 17 (standardisation) is also relevant, and empowers the Commission to adopt measures of bodies such as the ITU; however, neither ITU nor CEPT are included among the organisations to which the Commission can issue mandates to draw up standards.

²⁰⁰ Art. 10(2) Framework Directive.

²⁰¹ European Commission (2004), Treatment of Voice over Internet Protocol (VoIP) under the EU Regulatory Framework. Staff Working Document, p.19.

²⁰² At the time, several national authorities that are in charge of numbering in EU Member States were proposing to define 'new' number ranges for VoIP enabled services. See in that regard CISCO, Comments by Cisco Systems on European Commission (2004), Staff Working Document on the Treatment of Voice over Internet Protocol (VoIP) under the EU Regulatory Framework, p.11.

²⁰³ See also Nihoul, P. and P. Rodford (2011), EU Electronic Communications Law, Oxford University Press, 2nd ed, p. 104. They note that "under the RF, Member States must 'support' the harmonisation of numbers. As for harmonisation in general, the use of this mechanism is contingent upon the competent institution (fn 37: the European Commission...) demonstrating that harmonisation is necessary for the functioning of the internal market. In the context analysed here, harmonisation would not concern national legislation regarding the allocation and the use of numbers but would rather be limited to numbers. Through that process numbers would be designated as providing access to particular services throughout the European Union - as is the case, already, for emergency numbers in application of the Universal Service Directive".

- Article 10(5) of the Framework Directive explicitly deals with relations with international organisations such as the ITU, but confers authority only on the Member States, not explicitly on the Commission: "*Where this is appropriate in order to ensure full global interoperability of services, Member States shall coordinate their positions in international organisations and forums in which decisions are taken on issues relating to the numbering, naming and addressing of electronic communications networks and services.*" At the same time, the fact that Article 10 of the Framework Directive does not confer competences on the Commission does not mean that the Commission has no competence in this field (notably under Article 216 TFEU - international competence of the Union).²⁰⁴

This lack of explicit empowerment relative to the ITU on matters of numbering stands in stark contrast to the legal position in regard to spectrum management, despite the fact that the relationship of the EU to the CEPT and the ITU as regards spectrum is in principle otherwise similar to that for numbering (see Section 2.3.3). Article 4 of the Radio Spectrum Decision states that "*for the development of technical implementing measures ... which fall within the remit of the CEPT, such as the harmonisation of radio frequency allocation and of information availability, the Commission shall issue mandates to the CEPT, setting out the tasks to be performed and the timetable therefore ... On the basis of the work completed ..., the Commission shall decide whether the results of the work carried out pursuant to the mandates shall apply in the Community and on the deadline for their implementation by the Member States*". Moreover, "*if the Commission or any Member State considers that the work carried out on the basis of a mandate ... is not progressing satisfactorily having regard to the set timetable or if the results of the mandate are not acceptable, the Commission may adopt ... measures to achieve the objectives of the mandate*".

2.3.3 Institutional functioning

Management of numbers has to be understood in terms of its global context, just as is the case with spectrum management.

The management of numbers at global level is a function of the International Telecommunications Union, specifically ITU-T, and especially its Study Group 2. The ITU-T issues global standards such as E.164 (which governs the assignment of country codes) and E.212 (which governs the IMSIs that are associated with SIM cards).

At European level, oversight of relevant standards falls to the European Conference of Postal and Telecommunications Administrations (CEPT) and its Electronic

²⁰⁴ There are also clear limitations on the competence of the Member States. As soon as ITU or CEPT discuss matters that are the subject of common rules adopted by the EU, Member States are no longer entitled to enter into obligations.

Communications Committee (ECC). The CEPT region is not the same as that of the EU, and its relationship with the EU is complex. As the ECC explains, “[t]he *Electronic Communications Committee (ECC) brings together 48 countries*²⁰⁵ *to develop common policies and regulations in electronic communications and related applications for Europe, ... Its primary objective is to harmonise the efficient use of the radio spectrum, satellite orbits and numbering resources across Europe. It takes an active role at the international level, preparing common European proposals to represent European interests in the ITU and other international organisations.*”²⁰⁶

European regulation of numbers operates within the broader ambit of ITU rules and CEPT/ECC analysis, much as is the case with spectrum; however, there are important differences as well (see Section 2.3.2). The European Commission is empowered to adopt CEPT or ITU standards, but is not explicitly empowered to issue mandates to CEPT to study particular questions of interest regarding numbering (see Section 2.3.2).

Under Article 10 of the Framework Directive, Member States are to ensure that national regulatory authorities²⁰⁷ control the granting of rights of use of all national numbering resources and the management of the national numbering plans. Member States are to “...ensure that adequate numbers and numbering ranges are provided for all publicly available electronic communications services. National regulatory authorities shall establish objective, transparent and non-discriminatory procedures for granting rights of use for national numbering resources.” Member States are also called on to “support the harmonisation of specific numbers or numbering ranges within the Community where it promotes both the functioning of the internal market and the development of pan-European services”.

2.3.4 Implementation of key framework provisions in relation to access to numbers

In telecommunication networks, numbers are used for the purpose of addressing. There is a basic distinction between telephone numbers and technical numbers. Telephone numbers are numbers through which users can establish a connection to a particular destination. Technical numbers are used for different purposes, for example for the unique identification of mobile subscribers.

Globally, the International Telecommunication Union (ITU) regulates the number structure and use of numbers. These in recommendations adopted standards in the

²⁰⁵ Note that CEPT membership represents a considerably broader definition of Europe than the EU. It is for this reason that we generally refer to “countries” rather than “Member States” in this section.

²⁰⁶ See <http://www.cept.org/ecc/who-we-are/what-we-do/>.

²⁰⁷ Management at national level continues to be supported by the Member States. See for example position paper of the Netherlands on the review of the regulatory framework for electronic communications, 14 January 2016, p.8 which states that “national resources can be managed most efficiently at the national level, also in the case of cross-border use”.

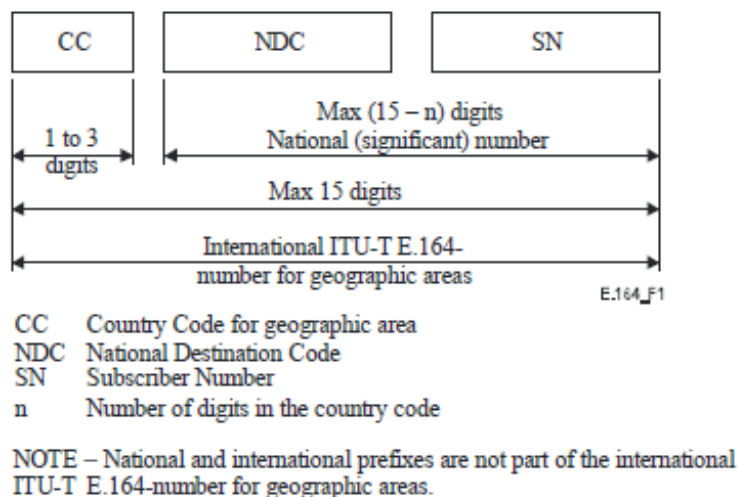
field of numbering, for example in terms of the maximum number length, are recognized worldwide ensuring for a smooth working communication between different countries. At a national level, the structure and configuration of the numbering space is subject to national regulatory authorities (NRA) with the aim to meet the needs of end-users, network operators and providers of electronic communications services. The following analyses will therefore focus exclusively on the management of these numbers in EU Member States.

Business models such as connected cars and smart meters mainly affect geographic telephone numbers (fixed and mobile wireless numbers) according to the ITU Recommendation E.164, and the so-called technical IMSI numbers by recommendation according to the ITU Recommendation E.212, which are used for the identification of mobile subscribers.

2.3.4.1 Procurement requirements for E.164 numbers

The E.164 recommendation specifies the components of a phone number as shown in Figure 20.

Figure 20: E.164 numbering structure for geographic numbers

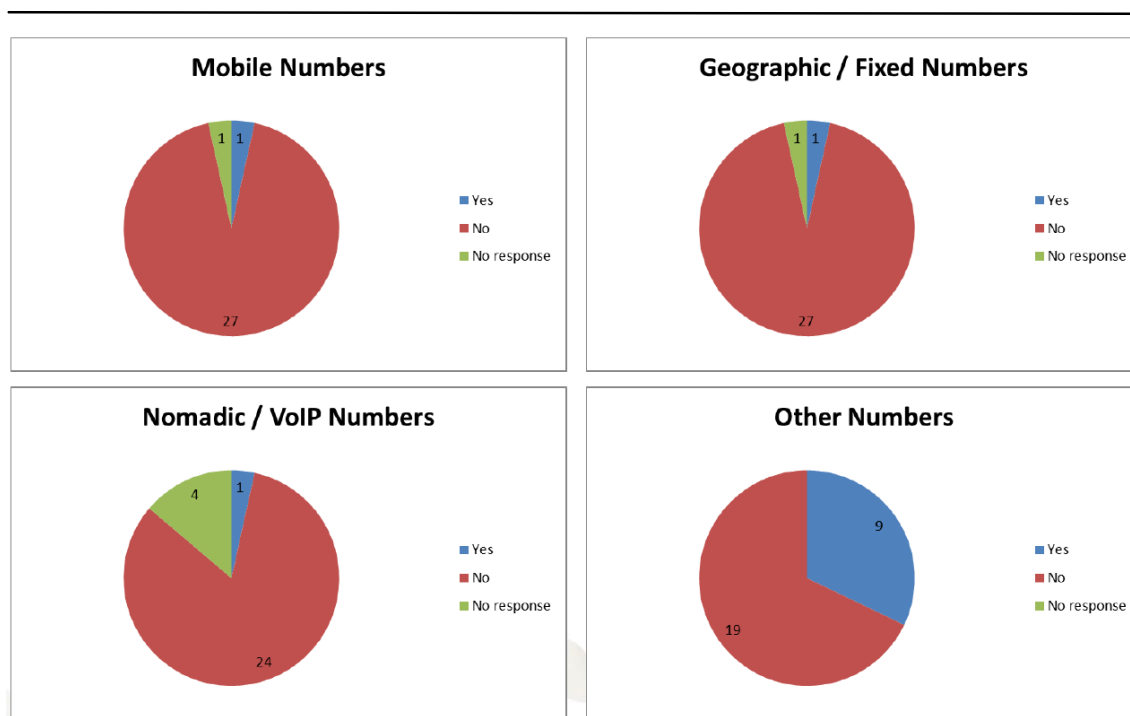


Source: ITU.

According to Article 10(1) of the Framework Directive, “Member States shall ensure that adequate numbers and numbering ranges are provided for all publicly available electronic communications services”. Article 10(2) states that NRAs “shall ensure that national numbering plans and procedures are applied in a manner that gives equal treatment to all providers of publicly available electronic communications services”.

Access to numbers based on this provision is usually granted only to ECN/ECS providers. Non-ECN/ECS providers such as M2M operators are in most countries excluded from access to numbers. The following figure (Figure 21) based on an assessment by CEPT illustrates this. NRAs were asked whether they assign E.164 numbering resources (non-geographic mobile numbers, geographic fixed numbers, nomadic numbers, other E.164 numbers) to non-ECN/ECS providers.

Figure 21: Assignment of numbers as of February 2016: Do NRAs assign E.164 numbering resources to non-ECN/ECS providers?



Source: CEPT (2015), Role and functioning of CEPT ECC WG NAN in the area of numbering. Presentation at joint EC-CEPT workshop in Brussels, 7 December 2015.

These results are confirmed by our analysis.

E.164 geographic numbers: In most EU Member States, ECN/ECS providers are the only recipients of E.164 geographic numbers (which are used for fixed line services). In most cases, non-nomadic VoIP providers are considered to be ECS providers, and are thus eligible. In some countries, an allocation of geographic numbers is also possible for non-ECN/ECS providers. In the Netherlands, for instance, a natural or legal person could also claim geographic numbers. This is also the case in Slovenia, as long as the activity is of public interest. In Poland, territorial self-governmental units conducting electronic communications activities and public administration units (e.g. Ministry of Interior) may also have the right for an allocation of numbers.

E.164 non-geographic numbers for public mobile telephony services: In most EU Member States, non-geographic E.164 numbers for mobile services are assigned not only to MNOs, but also to MVNOs. Some Member States also allow the assignment of numbering capacity to other providers of telecommunication services, such as fixed line SMS providers (i.e. providers that enable SMS messages to be sent or received to or from certain devices other than conventional mobile devices).

Other non-geographic numbers: There are many different categories of other non-geographic E.164 numbers, including Premium Rate Services (PRS), Information Service numbers, short dialling numbers, and M2M numbers. The eligibility criteria with regard to the assignment of numbers depend on the category. In most cases, only providers of ECS services are allowed to receive other non-geographic numbers.

2.3.4.2 Fees for E.164 numbers

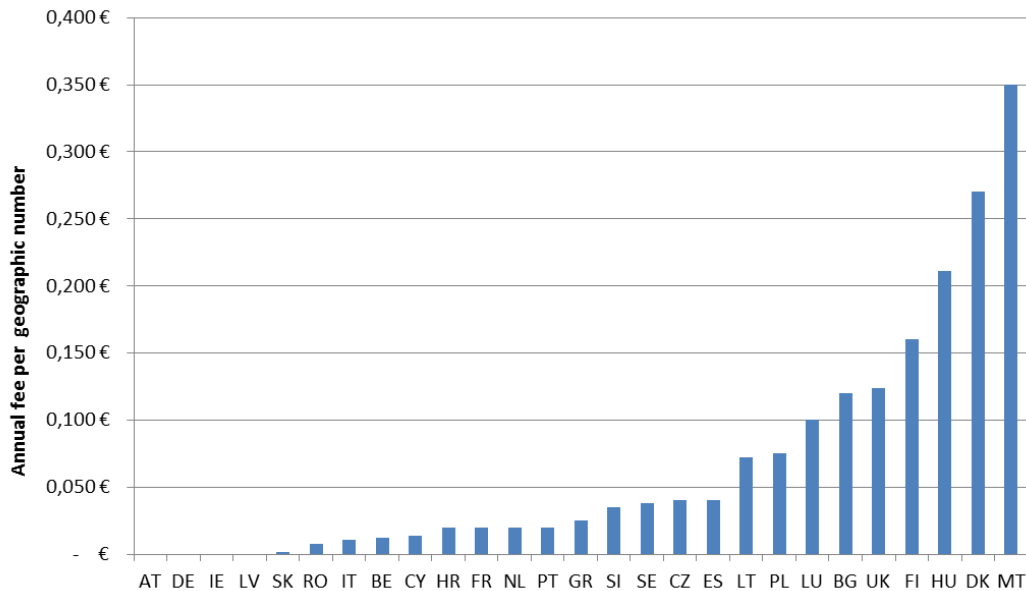
According to Article 13 of the Authorisation Directive, “*Member States may allow the relevant authority to impose fees for the rights of use for radio frequencies or numbers or rights to install facilities on, over or under public or private property which reflect the need to ensure the optimal use of these resources. Member States shall ensure that such fees shall be objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and shall take into account the objectives in Article 8 of Directive 2002/21/EC (Framework Directive).*”

The following tables provide an overview regarding fees set for E.164 numbers, distinguishing between geographic, non-geographic numbers for mobile services and non-geographic numbers for M2M services.

E.164 geographic numbers

We analysed practices regarding E.164 geographic numbers for all 28 EU Member States. In Estonia, there are no geographic numbers. Overall fee setting approaches differ between Member States, contributing to different fees charged, as shown in Figure 22.

Figure 22: Annual fees for the use of E.164 geographic numbers in all EU Member States that provide them, 2016.



Source: WIK Consult/Cullen International. Note that there are no geographic numbers in EE.

A few countries (Austria, Ireland, and Latvia) do not impose any fees for E.164 geographic numbers. In all three of these countries, all NRA costs are financed from revenue-based administrative charges (together in the case of Ireland with spectrum management fees), and any difference in costs is covered from the state budget. Latvia is however considering whether to introduce fees for E.164 numbers.

23 countries impose an annual fee. Of those 23 countries, 7 countries (Belgium, Cyprus, Greece, Hungary, Luxemburg, Malta, and Portugal) also impose a one-off allocation fee. Germany imposes one-off fees per block of numbers, but no annual charges.

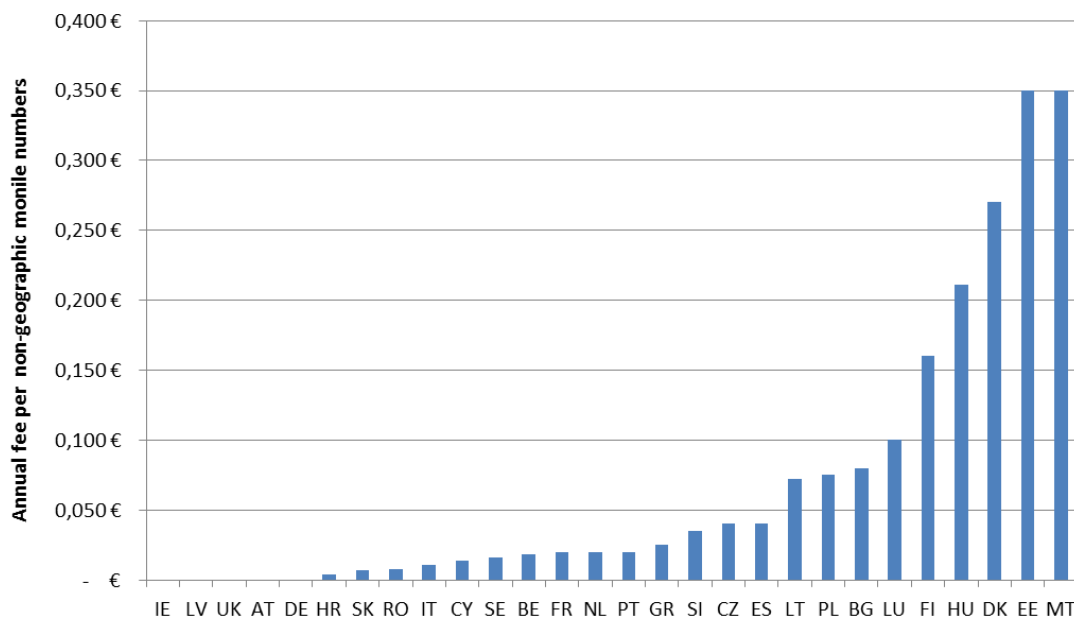
The level of annual fees differs greatly between Member States. According to our data base, annual fees for E.164 geographic numbers range between € 0,00 and € 0,35 per number. The average annual fee for E.164 geographic numbers in the EU is € 0,066 per number. The coefficient of variation is 0,99.²⁰⁸

²⁰⁸ The coefficient of variation (CV) refers to a statistical measure of the distribution of data points in a data series around the mean. It represents the ratio of the standard deviation to the mean. Distributions with a coefficient of variation to be less than 1 are considered to be low-variance, whereas those with a CV higher than 1 are considered to be high variance.

E.164 non-geographic numbers for public mobile telephony services

All 28 EU Member States were analysed (see Figure 23). Overall fee setting approaches differ between Member States. Four countries (Austria, Ireland, Latvia, UK) do not impose fees for E.164 non-geographic mobile numbers. 23 countries impose an annual fee. 7 countries (Belgium, Cyprus, Greece, Hungary, Luxembourg, Malta, Portugal) also impose one-off fees. Germany only imposes one-off fees per block of numbers. The level of fees differs greatly between the Member States. According to our data base, annual fees for E.164 non-geographic numbers range between € 0,00 and € 0,35 per number. The average annual fee for E.164 non-geographic mobile numbers in the EU is € 0,07 per number. The coefficient of variation is 1,07.

Figure 23: Annual fees for the use of non-geographic numbers for public mobile services in all 28 EU Member States, 2016

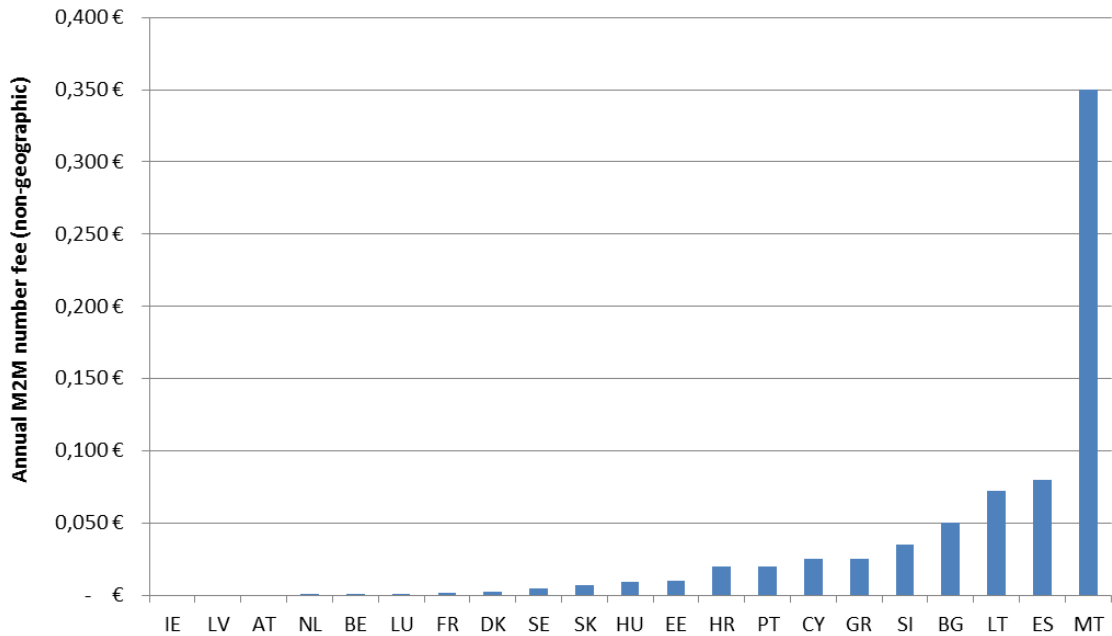


Source: WIK Consult/Cullen International

E.164 non-geographic M2M numbers

We analysed 21 EU Member States (see Figure 24). Overall fee setting approaches differ between Member States. 18 impose an annual fee. Three countries (Cyprus, Greece and Luxemburg) also impose one-off allocation fees for other non-geographic numbers. The level of fees differs greatly between the Member States. According to our data base, annual fees for E.164 non-geographic M2M numbers range from € 0,00 to € 0,35 per number. The average annual fee for E.164 non-geographic M2M numbers in the EU is € 0,034 per number. The coefficient of variation is 1,17.

Figure 24: Annual fees for the use of non-geographic M2M numbers in 21 EU Member States, 2016

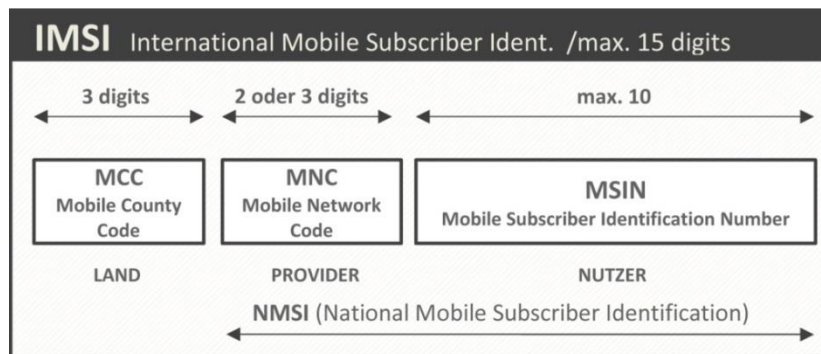


Source: WIK Consult/Cullen International.

2.3.4.3 Procurement requirements for E.212 numbers

E.212 are unique identifiers for mobile subscribers (International Mobile Subscriber Identity, IMSI). E.212 numbers are needed for addressing participants of mobile wireless services and have international validity and significance. Components of E.212 numbers are illustrated in Figure 25.

Figure 25: E.212 numbering structure for IMSI



Source: ITU.

MNCs constitute the key bottleneck in the field of E.212 numbers. In all European countries, two-digit MNCs are awarded. This means that a maximum of 100 MNCs per country or per mobile country code (MCC) can be assigned. While this capacity is usually sufficient for existing mobile services, the development of M2M could have an impact on demand for IMSI numbers in the future.

There have been discussions in EU Member States in the recent past regarding possible scarcity of MNCs mainly due to M2M developments. The Netherlands were one of the first countries to study different options of handling additional demand in the context of M2M. In 2014, a technical proxy solution for the sharing of MNCs was introduced by the Minister of Economic Affairs.²⁰⁹ This medium term solution may mitigate both the risk of a number shortage of MNCs and the risk of operator lock-in effects for M2M service providers. Under a Home Location Register (HLR)²¹⁰ Proxy Provider, several M2M providers have the ability to manage their own number blocks. A limitation of this approach is that it does not provide for a simplified international use of IMSI numbers.²¹¹

Sweden is another country where options to extend MNC capacities for M2M were discussed in the recent past. The Swedish regulator PTS commissioned a study on the feasibility of using 3-digit MNCs in addition to the use of 2-digit MNCs. The conclusion was that implementation would be associated with relatively high technical difficulties for network operators, inasmuch as 3-digit MNCs are not recognised by the 3GPP terminals in most European countries. For a full-fledged international application,

²⁰⁹ Besluit van de Minister van Economische Zaken van 3 maart 2014, nr. ETM/TM/14024019 in Staatscourant Nr. 6781, 12 maart 2014.

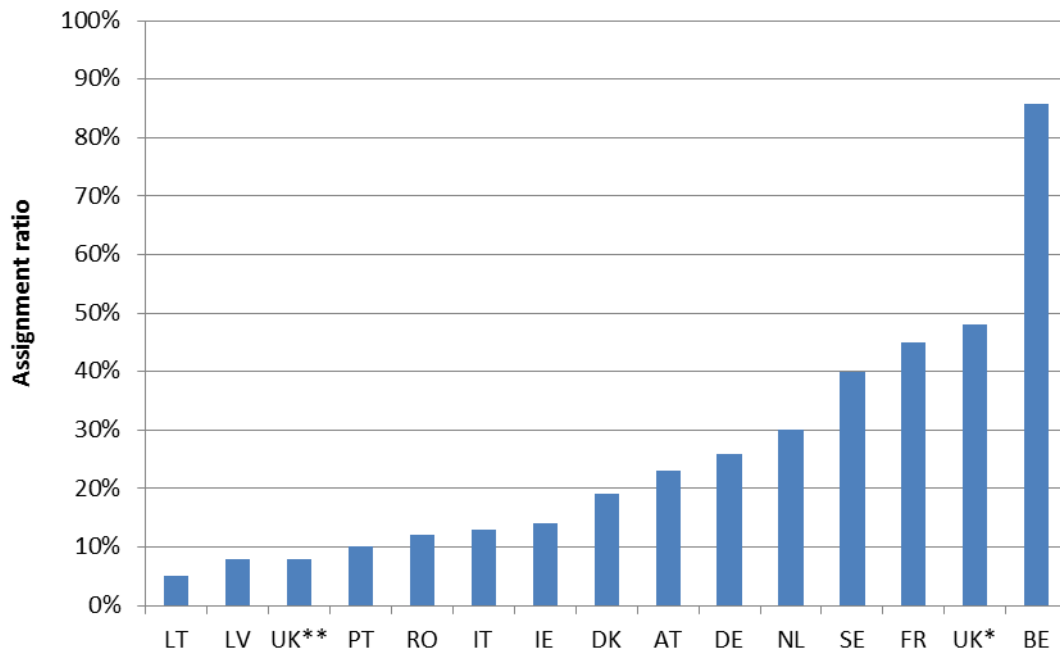
²¹⁰ The Home Location Register (HLR) is the main database of permanent subscriber information for a mobile network.

²¹¹ Stratix (2013), Gedeeld gebruik MNC's voor M2M toepassingen, Rapport uitgebracht aan het Ministerie van Economische Zaken, Hilversum., April 2013.

harmonisation at global level is necessary.²¹² The German regulator (BNetzA) had also commissioned a similar investigation in the recent past.²¹³

Figure 26 shows the current utilisation rate of MNCs (i.e. the fraction of MNC numbers potentially available that are currently assigned) in selected EU Member States.²¹⁴ Possible reasons for the differences that are visible include i) different stringency of allocation rules (as explained shortly), ii) the number of market players, and iii) different levels of efficiency regarding numbering management. Overall, the average utilisation rate in the EU is 27%, and the coefficient of variation is 0,59.

Figure 26: Fraction of potentially available MNCs assigned in 14 Member States, 2016



* and ** - The UK has two Mobile Country Codes (MCCs), each with its own fraction of potentially available MNCs.

Source: WIK Consult/Cullen International.

Except for Belgium, there seems to be sufficient capacity in all EU Member States at the moment. One important reason for this is that allocation rules in most countries do

²¹² Olsen (2014), Report on mixed use of 2 and 3 digit MNC codes under Sweden's MCC 240, Study for PTS.

²¹³ Lucidi, S. and U. Stumpf (2014), Implications for the management of numbering due to the internationalization of telecommunications networks and services, WIK Discussion Paper (in German).

²¹⁴ Out of a maximum of 100 MNCs that may be assigned per country. CEPT (2014), Evolution in the Use of E.212 Mobile Network Codes, ECC Report 212, pp. 27-30..

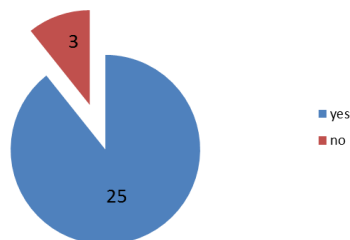
not allow for an allocation of MNCs to market participants that are not electronic communications (ECN/ECS) providers.²¹⁵

In the majority of the EU Member States, only Mobile Network Operators (MNOs) and full MVNOs or MVNOs with at least a modicum of infrastructure of their own (such as own their own Home Location Register (HLR)) are eligible to apply an for MNC (see Figure 27). Exceptions are Croatia, Cyprus and Latvia, where the NRA only makes a direct allocation of MNCs to MNOs. In those countries, MVNOs are still able to obtain MNCs in an indirect way, namely by asking their MNO partners.

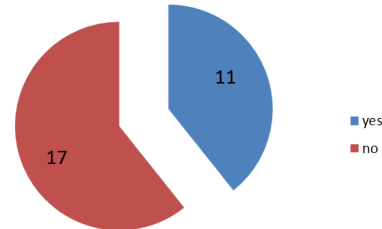
Eleven out of 28 Member States (Bulgaria, Hungary, Ireland, Italy, Luxemburg, the Netherlands, Poland, Portugal, Romania, Spain and Sweden) allow the assignment of MNCs to providers of non-mobile services, an example being *fixed-line SMS services* that enable SMS messages to be sent or received to or from certain devices other than conventional mobile devices.²¹⁶ In some cases, the non-mobile SMS service provider needs an MNC in order to be able to terminate SMS traffic destined for its end users. The MNC may also be needed for billing purposes.²¹⁷

Figure 27: Assignment of MNCs to MNOs, MVNOs and others in the EU, 2016

Assignment of MNCs to MVNOs



Assignment of MNCs to non- MNOs/MVNOs



Source: WIK Consult/Cullen International.

²¹⁵ The RFEC requires only that “Member States shall ensure that adequate numbers and numbering ranges are provided for all publicly available electronic communications services” (Art. 10(1) Framework Directive).

²¹⁶ The fixed-line SMS service is usually provided by a SMS service provider or fixed line telecoms operator. The service will send texts to and from mobile phones and between fixed line phones. For subscribers without SMS enabled handsets, the operator converts the text to speech. Typical applications include the sending and receiving of SMS from connected devices (e.g. PC or smartphone) or providing bulk SMS from a business to its customers. Some versions of the service may be national-only, but most SMS service providers offer services across borders.

²¹⁷ See also CEPT (2014), Evolution in the Use of E.212 Mobile Network Codes, ECC Report 212.

2.3.4.4 Fees for MNCs (E.212 numbers)

We analysed fees for MNCs in 27 EU Member States.²¹⁸ Overall fee setting approaches differ between the Member States.

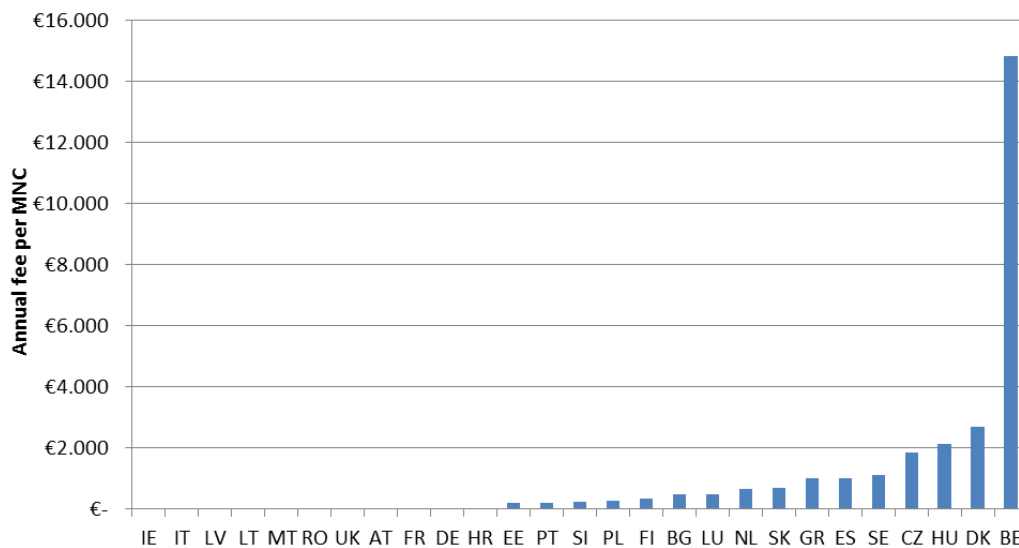
Nine EU Member States (Austria, France, Ireland, Italy, Latvia, Lithuania, Malta, Romania, and the UK) do not impose any fees at all for MNCs. All of the remaining EU Member States with the exception of Germany impose annual fees for MNCs. Germany does not impose an annual fee for MNCs, but imposes a one-off fee of € 120 per 10 million IMSIs.²¹⁹ Four EU Member States (Belgium, Greece, Luxemburg, Portugal) impose one-off fees in addition to annual fees.

The level of annual fees for MNCs differs significantly between Member States, as is shown in Figure 28. Annual fees range from € 0 to € 14.805 per MNC. The average annual fee is € 1.045, with a median of € 236. The coefficient of variation of annual fees is 1,23, which indicates a relatively wide dispersion of annual fees for MNCs in Europe inasmuch as the standard deviation is greater than the mean.

²¹⁸ We found no information on MNC fees in Cyprus.

²¹⁹ The one-off fee is € 120. Given that an MNC can support one billion IMSIs, this one-off fee corresponds to € 12.000 per MNC $((1,000,000,000 / 10,000,000) * € 120 = € 12.000)$.

Figure 28: Annual fee per MNC in 27 Member States, 2016



Source: WIK Consult/Cullen International²²⁰

2.3.5 The views of stakeholders on implementation, outcomes and institutional functioning

2.3.5.1 Rights of use for E.164 numbers

As far as extending the rights to obtain and use numbers to non-ECN/ECS providers, the EU consultation (*Q.137*) demonstrates a wide range of views. The background of this discussion is that assigning numbers directly to M2M operators is one of the options to address the risk of lock-in effects on the part of MNOs.

MNOs, including smaller ones, argued that extending the rights to obtain and use numbers to non-ECN/ECS providers would raise many implementation and security issues. They argued that it would raise the risk of fraud, might exhaust national number resources, would endanger interoperability and end-to-end connectivity, and would create regulatory asymmetries inasmuch as the new number assignees would not have to comply by the same obligations as ECN/ECS providers.

ECTA, individual MVNOs, and other non-MNO market players such as IT/cloud/connectivity service providers, M2M operators and consumer associations support extending the rights of use of numbers on the ground that this would foster

²²⁰ We found no information for Cyprus.

competition and innovation. It must be noted, however, that the arguments of the few non-traditional stakeholders who have responded in favour of a more flexible number assignment are far less developed than the arguments against a more flexible approach, which are defended by traditional stakeholders of the telecom industry. The latter also refer to available (technological) alternatives (e.g. over-the-air embedded SIM).

2.3.5.2 eSIM (over the air SIM cards)

Overall, a clear majority of respondents of the EU consultation sees a demand for over-the-air (OTA) provisioning of SIM cards in the near future, both for M2M and end-user devices (Q.140). The main arguments in favour of OTA provisioning for M2M communications include:

- a. lower costs, when SIMs are embedded in devices,
- b. the possibility for corporate customers to switch operators for all of their devices (e.g. car manufacturers) and hence to avoid lock-in effects,
- c. increased efficiency of processes, and scalability of business models for M2M.

The arguments against OTA are mainly based on risks to security, uncertainty of demand, and unclear contractual relations.

A clear majority of respondents to the EU consultation is against active promotion by regulation of over-the-air (OTA) provisioning of SIM cards (Q.141.) One of the main arguments put forward in this regard was that industry is already voluntarily moving forward to market-driven solutions. Some respondents called for competition authorities to monitor the developments so that possible proprietary solutions will not limit competition, and to mitigate the risk that closed approaches might limit customer choice and lead to walled gardens. Standards should enable all interested operators (including smaller operators) to enter the OTA SIM card market.

2.3.5.3 Harmonisation of numbering approaches at EU level

Some respondents to the EU consultation called for a harmonised EU approach and framework for the allocation of numbers, in order to ensure coherence at EU level and to prevent local, specific rules (Q.137). In this regard, however, BEREC expressed concerns and reservations. BEREC argues that different countries face different challenges and therefore need flexible solutions at national level. BEREC sees the over-the-air embedded SIM as an easier solution raising fewer issues. This view was also broadly shared by the respondents to the interviews we conducted.

2.3.5.4 Suitability of national numbering plans for M2M (extraterritorial use)

Most consultation respondents agreed (Q.139) that national numbering plans are suitable for cross-border M2M communications. The implementation costs of Europe-wide numbers are judged to be disproportionate in comparison to the additional value they would provide. There is a substantial consensus that national numbers and global numbers are sufficient and appropriate to cope with the numbering needs of M2M in the future, provided that extra-territorial use of numbers is allowed for M2M. This view is consistent with that of respondents in the interviews we conducted. Given however that M2M services are often offered in an international context, the possibility of extra-territorial use of national numbers appears to be an important precondition for the development of M2M.

2.3.5.5 Alternative addressing formats

Most respondents to the EU consultation (Q.138) took issue with the need to include alternative addressing formats in support of the identification and authentication of M2M networks in the framework. They see these issues pertaining to ongoing international technical standardisation. As there is no evidence of market failure, nor any evidence that the industry is failing to address market needs, there is no need to regulate these formats on an EU level.

2.3.6 Outcomes and problem areas

2.3.6.1 Procurement requirements for E.164 numbers

In general, current framework provisions in relation to numbers seem to work effectively and efficiently for different service categories such as Publicly Available Telephone Services, VoIP Services and M2M Services. In all EU countries, they ensure availability of numbers as well as appropriate number allocation.

There is an ongoing debate in relation to extraterritorial use of E.164 numbers. There is a demand for further flexibility with regards to an extraterritorial usage of E.164 numbers, especially in the context of new technological and business developments such as M2M services. The question is, whether there is a need to act at EU level. Challenges are either handled on the level of international expert working groups such as CEPT or bilaterally between individual countries or groups of countries.

Technological and service innovations such as M2M increase the demand for a more flexible use of E.164 numbers, especially with regards to the use of E.164 numbers from one country in another country on a temporary or on a permanent basis.

Today, M2M operators seeking to offer their services across borders cooperate with mobile network operators that can provide an international communication network for M2M applications over existing roaming agreements. Companies like Vodafone have a worldwide coverage and can offer their global network to M2M customers.²²¹ Other mobile operators with a smaller global coverage form alliances to offer M2M customers so-called all-in-one solutions. M2M World Alliance,²²² Global M2M Association²²³ and Bridge M2M Alliance²²⁴ are three of the world's largest alliances in this regard.

From an M2M provider's point of view, the benefits of an all-in-one solution are offset by the disadvantages of the risk of an operator lock-in effect and the costs of international roaming charges, which may have a negative impact on the development and growth of a M2M provider or its services.

These developments have triggered a debate about the possibility of an extra-territorial use of E.164 numbers, which is visible in various CEPT reports, old and new.²²⁵

Based on various statements in the conducted expert interviews, there is however a demand for a more flexible usage of E.164 numbers, especially in relation to extraterritorial usage with regard to M2M services. Discussions about extraterritorial usage are therefore ongoing under various expert groups. CEPT in this regard has recently launched a Recommendation on the extraterritorial use of E.164 numbers, with high level principles of assignment and use.²²⁶

CEPT recommends that:²²⁷

1. *that CEPT Administrations should, as a general principle, only assign and only permit the use of E.164 numbers belonging to their national numbering plans for the provision of services inside their own territory.*
2. *that CEPT Administrations should, as a general principle, only assign and only permit the use of E.164 numbers belonging to their national numbering plans for the provision of services inside their own territory.*

²²¹ For their international M2M customers with a need for coverage in several countries large mobile operators usually use international ITU numbers with a global coverage, which allow for a cross-border marketing of services and are directly assigned by the ITU.

²²² With amongst other companies KPN and Telefónica
(http://www.m2mworldalliance.com/#section_about).

²²³ With amongst other companies Deutsche Telekom and Orange
(<http://www.globalm2massociation.com/aboutus/>).

²²⁴ Mainly active in the Asian Region
(<https://www.bridgealliance.com/M2M.aspx>).

²²⁵ See for instance: CEPT (2013), Extra-territorial use of E.164 numbers, ECC Report 194.

²²⁶ CEPT (2016), "Extraterritorial Use of E.164 Numbers – High level principles of Assignment and use", ECC/REC/(16)02. (approved 28 April 2016).

²²⁷ *Ibid*, pp. 3-45.

- a. there should be a clear and evident net benefit to the citizens, customers (including business customers) and service providers of the country providing the numbers for extra-territorial use, as assessed by the administration of this country; and*
 - b. there should be no net negative effect to the citizens, customers (including business customers) and service providers in the country where the numbers will be used, as assessed by the administration of this country, either as parties using the numbers or as parties calling the numbers.*
- 3. that information regarding in which countries and for what type of services the numbers are used/intended to be used should be provided by the assignee/applicant.*
- 4. that in cases where problems arise the involved CEPT administrations should cooperate in order to ensure that the principles identified in this Recommendation are respected.*

On the basis of this Recommendation, the question remains at what level (global versus regional) the problem of extraterritorial use of numbers should be addressed. The Recommendation leaves considerable discretion to CEPT administrations.

The new Recommendation is fully in keeping with long-standing ITU and CEPT policy, but one can ask whether it pays sufficient attention to the still emerging needs of M2M services. It discourages extraterritorial use, and places the full burden of proof of need on each individual CEPT member country. To the extent that it might eventually restrict new services such as M2M, or existing services such as nomadic VoIP, it might prove to be problematic.

In addition, one might also question the compliance with the provisions of the Treaty on the Functioning of the European Union (TFEU) governing the freedom to provide services, inasmuch as the restrictions may constitute a disproportionate administrative measure hindering operators who seek to provide cross border services.

We also have process concerns. The members of ITU are governments and (as sector members) network operators. Incumbent operators have a strong voice. Those who wish to provide new services may possibly be under-represented. As noted in Section 2.3.2, the Commission has very limited explicit powers to act in issues relating to CEPT or ITU. We will consider alternative approaches as part of the analysis of Options in Section 3.

2.3.6.2 Fees for E.164 numbers

According to the current framework, fees are a means of promoting the optimal use of resources on the one hand, and on the other hand should not hinder the development of innovative services or act as a barrier to competition. This means that it is up to the individual Member States to determine the level at which numbering fees are set. In the context of different Member States facing different challenges in the future, this flexibility will remain useful.

2.3.6.3 Procurement requirements for E.212 numbers

Possible scarcity with regard to MNCs due to M2M developments do not appear to be an issue in most EU countries.

- Practically all countries have sufficient capacities to deal with an increasing demand for MNCs in the near future.
- In individual cases existing mechanisms can handle further demand. Some countries such as the Netherlands have already implemented an individual solution. The question remains whether a uniform way at EU level is more appropriate.

The question of an extension of the allocation rules for numbers to non-ECN/ECS providers such as M2M providers does not seem to be an issue.

- Potential operator lock-in effects might be eliminated by a timely use of standardised eSIMs.
- M2M providers seem to have little interest in having their own numbering ranges as long as cooperation with mobile operators works well (see the discussion of extraterritorial use of E.164 numbers in Section 2.3.6.1).
- Mobile operators are able to offer both national and international solutions to M2M providers. National numbering plans are a suitable means of administering numbers for national M2M communications. Where M2M operators need cross border solutions, mobile operators can rely on the use of international MNCs allocated directly by the ITU under the MCC901.

2.3.6.4 Fees for MNCs

As noted in Section 2.3.4.2, current framework provisions provide Member States with a useful level of flexibility as regards E.164 fees. Flexibility is needed in order to strike a balance between ensuring optimal use of resources, while not hindering the evolution of business developments.

2.3.7 The performance of key framework provisions relating to access to numbers

2.3.7.1 Effectiveness

Competition

If the assignment of numbers to undertakings were discriminatory, it could introduce competitive distortions. Concerns were indeed raised years ago when some Member States declined to issue geographic numbers to providers, as noted earlier in this section.

Today, we have identified no obvious competitive problems in regard to number management, nor have stakeholders raised issues to us.

As regards efficiency of number assignment according to Article 10 of the Framework Directive, our interviewees felt that the experts that undertake this work are doing a quite competent job. Relative to needs to date, we see nothing to contradict this view; however, it is possible that their approach is too tightly bound to the past, and does not take sufficient cognizance of future needs.

We have identified numerous technical challenges going forward, but no specific indications that current arrangements cannot address them. Many of the stakeholders whom we interviewed expressed the concern that any Commission intervention in the numbering area could easily do more harm than good.

Based on our assessment of the framework provisions and institutional arrangements, we have concerns that the Commission's prerogatives in dealing with international organisations such as CEPT and ITU for numbering issues are considerably more limited than they are for spectrum issues, and may not be sufficient (see Section 2.3.1.5 and Section 2.3.2).

Internal market

Regarding the objective of contributing to the development of the internal market, especially in the context of providing services at European level, an aspect that is in the focus of discussion and often highlighted by stakeholders is a more flexible use of numbers, especially in the context of extraterritorial use. Through Article 10(5) of the Framework Directive, the current framework provides the possibility of coordination between Member States through international organisations such as CEPT. In addition, the Commission has the option to take technical implementing measures in case there is a need for harmonisation of numbering resources in the Community to support the development of pan-European services (Article 10(4)). Even though these provisions are intended to contribute to the development of the internal market as regards

numbering, better coordination between Member States, the Commission and international organisations might be helpful.

2.3.7.2 Efficiency

Our sense is that the number space based on current provisions (Article 10 of the Framework Directive, Articles 5 and 13 of the Authorisation Directive) is efficiently managed. These identifiers are not tangible like spectrum – one can, in principle, always expand the number. Current numbering plans appear to be sized appropriately, and accommodate national preferences.

Regarding the fees for rights of use for numbers (Article 13 of the Authorisation Directive), the view of stakeholders is that the benefits have exceeded the costs and that the costs involved, in most EU Member States, are reasonable.

In some individual Member States, the cost for the use of numbers seems relatively high. To a certain extent, the diversity of approaches regarding the collection of fees for the rights of use of numbers may therefore be criticised as being efficient and as possibly inhibiting the development of an internal market and the promotion of competition.

However, a general harmonisation of numbering rules at EU level is not desired by stakeholders. Current arrangements allow for a certain degree of Member State flexibility, which helps to ensure the optimal use of numbering resources.

Numbering is a surprisingly complex area when one gets into the details. Most NRAs and most large network operators appear to have one or two highly specialised experts. This seems to be appropriate.

2.3.7.3 Coherence

The regulation of numbering resources is spread, not always very consistently, over the Framework Directive, the Authorisation Directive²²⁸ and the Universal Service Directive. In particular, Article 10(2) of the Framework Directive (equal treatment to providers of publicly available telephone services) overlaps Article 6 Authorisation Directive (conditions attached to general authorisations) and Article 21 (NRAs must be empowered to impose the provision of "applicable tariff information to subscribers regarding any number or service subject to particular pricing conditions"), Article 25(2) (information for telephone directory services), Article 27(3) (rates for calls to ETNS numbers), Article 28 (access to numbers and services) and Article 30 (number portability) of the Universal Service Directive. The RFEC would benefit in readability if all provisions relating to numbering were concentrated in a single chapter.

²²⁸ Art. 5 (rights of use), Art. 6 (conditions attached to general authorisations), Art. 7 (procedure for limiting the number of rights of use of numbers), Art. 10 (compliance with conditions), Art. 13 (fees for rights of use), Annex Part C (Conditions which may be attached to rights of use for numbers).

This being said, we have not identified any particular respect in which the numbering provisions of the RFEC are internally inconsistent. We have however noted that the prerogatives of the Commission *vis-à-vis* international organisations such as CEPT and ITU are far more limited for numbering than they are for spectrum.

2.3.7.4 Relevance

In terms of relevance of the provisions, the overall view is that current provisions in relation to numbering management have supported an effective management of numbering resources in the EU and hence will be also needed in the future.

Delegation of numbers at global level is based on national country codes, which means the administration at Member State level would be difficult to avoid. Moreover, consumer preferences at national level as to the structure of numbers are ingrained, and hard to change.

Regarding an additional intervention at the European level concerning extending allocation of numbers to non-ECN/ECS provider (M2M numbering), MNC scarcity and extraterritorial use opinions of stakeholders differ.

Most Member States have introduced M2M numbering ranges on the basis of current provisions. Stakeholders see no reason to expand the allocation criteria to M2M providers because in most countries there is no demand for numbers from M2M providers. And if there is a demand, individual solutions are possible based on current provisions, as for example is the case in the Netherlands.

With regard to potential scarcity of MNCs, the overall view of stakeholders is that no further intervention at European level is needed. Member States have sufficient capacity to deal with future demand, also with regard to the development of new business models. Moreover, it can be observed that more and more MNOs operating cross-border in the EU are extending their roaming footprint based on international ITU numbering resources (especially with regard to M2M services).

Regarding the extraterritorial use of numbers, opinions vary. There is an overall demand for further harmonisation in this regard, although it is not clear whether such harmonisation should be developed at a global or regional level.

Finally, the European role is necessary, not only in terms of coordination with CEPT/ECC and with the ITU, but also due to specialised provisions including number portability, and special numbers including 112 and 116.

2.3.7.5 EU value added

As noted in Section 2.3.7.4, a European role continues to be appropriate.

Experience with ETNS (see Section 2.3.1.5) suggests that there continues to be institutional interest in a European identity in terms of numbers, coupled with a suitable

pricing model. This could be viewed as an unfulfilled need or desire as regards EU added value.

2.3.7.6 Conclusions

In terms of *effectiveness*, current arrangements for the most part function well, both in terms of enabling competition and of fostering the single market. There is however a growing need for more flexible use of numbers, especially in the context of a long term extraterritorial use, as a consequence not only of nomadic VoIP but of increasing usage of M2M communications and the Internet of Things (IoT) (including connected cars).

We identified no problems in regard either to the efficiency of assignment of numbers, or to the efficiency of institutional arrangements used to assign them.

That regulation of numbering provisions are spread across the Framework Directive, the Authorisation Directive and the Universal Service Directive, does not positively contribute to *coherence*. Meanwhile, the prerogatives of the Commission vis-à-vis international organisations such as CEPT and ITU are far more limited for numbering than they are for spectrum.

Arrangements in place at EU level continue to be *relevant* to their objectives. They contribute for instance to the interoperability of services across the EU, and to uniform consumer expectations (for instance, in regard to the use of “00” for international calls, and of “112” for emergency services).

Number management requires a degree of European coordination, and offers clear EU value added. The unfulfilled desire for an EU numbering identity could be viewed as a gap in terms of *EU added value*.

2.4 Access to scarce resources – land

The Section is structured as follows:

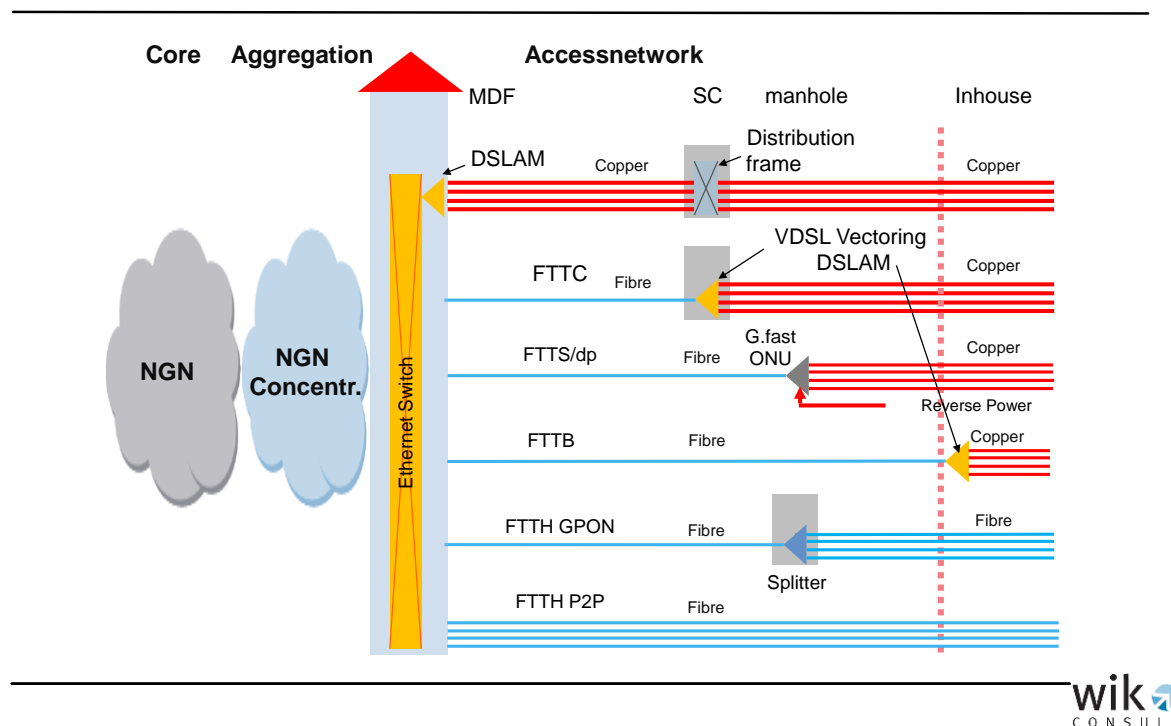
- Section 2.4.1 summarises the key technological and commercial trends relevant for access to land (rights of way).
- Section 2.4.2 describes key provisions regarding access to land.
- Section 2.4.3 assesses the implementation of the framework provisions with regard to rights of way.
- Section 2.4.4 looks at institutional functioning.
- Section 2.4.5 assesses the performance of the provisions.

2.4.1 Key commercial developments regarding access to land

With regard to fixed networks, the upgrade from the legacy copper access networks towards new NGA networks requires exchanging the copper lines in part or completely, or overbuilding them with fibre lines. This development has a significant impact on the existing rights of way, or causes demand for new rights of way. All electronic communications access lines are affected in principle.

There are different NGA architectures being deployed in the Member States, differing by areas (geotypes) and their population densities. All have in common that the copper line between the local exchange location and the end-customer premises will either become significantly shorter or will be exchanged out completely (see Figure 29). This is due to the fact that high bandwidth transmission can only be achieved over copper lines at short distances – the shorter the copper line, the greater the possible bandwidth. This is in contrast to optical fibre, where the bandwidth available is largely invariant as a function of cable length.²²⁹

Figure 29: Overview over modern NGA architectures and technologies



Source: WIK-Consult.

Depending on the NGA architecture more or significantly more fibre lines will have to be constructed. The long term and only really future proof solution will be FTTH, where all

²²⁹ Depending on the line-driving laser systems, fibre lengths of more than 1.000 km can be implemented (e.g. undersea cables) without intermediate signal regeneration and amplification.

the copper lines are replaced by fibre. Fibre lines are also required to serve the next generation mobile network antenna locations with high bandwidth.

Whether the replacement of the copper lines requires digging new trenches, rather than use only of existing duct or pole infrastructure, depends on how the copper access network has been deployed. Is aerial used at all? Are ducts already installed, or are the cables directly buried, so that new trenches have to be dug? Further, because new fibre has to be deployed before old copper lines are switched off or removed, there has to be sufficient spare capacity for parallel or overbuild deployment.

Historically, access to land or rights of way on for electronic communications operators was generally managed at Member State, regional or municipal level. Even where rights to deploy existed in principal, it was generally the case that underground construction work, the construction of cabinets or of aerial lines has required some form of permission of the local authorities.

Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks²³⁰ (the Cost Reduction Directive, or CRD) seeks to ameliorate this problem by coordinating civil works²³¹ and by obliging Member States to take “the necessary measures, in order to ensure that the competent authorities grant or refuse permits within four months from the date of the receipt of a complete permit request”.²³² The CRD is not part of the RFEC, but it potentially contributes to the effectiveness of the RFEC. It is too early to know whether these measures are effective, since Member States have only been obliged to apply them since 1 July 2016.²³³

The demand for these permissions is increasing significantly, but depends on the type of NGA architecture being rolled out. New construction is not always needed, however, since it is sometimes possible to re-use spare or empty infrastructure.

The demand for access to rights of way may be influenced by the degree to which third party suppliers (telecommunication operators, utilities, city authorities, public transport and traffic control, private companies, ...) can also offer spare (pole or underground) capacity. New pressure for such offers arises from the national implementation of the aforementioned broadband Cost Reduction Directive 2014/61/EU, where owners of such infrastructure are obliged to meet reasonable requests for access to their physical infrastructure. Their motivation to provide such infrastructure will be supported by fair pricing rules allowing them to recover their specific cost plus some margin. Hence, the Directive relies mainly on commercial negotiations, with the possibility however to have recourse to dispute resolution.

²³⁰ [2014] OJ L155/1.

²³¹ Arts. 5 and 6 Cost Reduction Directive, .

²³² Art. 7 Cost Reduction Directive.

²³³ Art. 10 Cost Reduction Directive.

In contrast to access networks, one can assume that the core network connecting lines typically are already high capacity fibre cables, so that new demand for rights of way for the core network is not expected to arise.

How the fibre access lines (depending on the NGA architecture) gain access to buildings depends on national law. The demand for rights of way over private property and for building access will increase with broadband demand and will depend on the NGA architecture (i.e. whether it is FTTB or FTTH). Sooner or later, the demand will arise. Typically serving a building requires the permission of the building owner, and it is reported that their willingness to cooperate is poor in many cases. Often standards for in-building wiring (e.g. cat 6 copper wiring or duct systems) are missing or are not mandatory, so that cabling becomes expensive. In MDUs (multi dwelling units), meeting all tenants for installation within a day or week may become extremely challenging and very expensive. Also in some cases the building owners may try to charge the NGA operators for the right of way within the building, which may hamper broadband internet access for the tenants. Once again, the broadband Cost Reduction Directive has introduced measures that seek to address the problem;²³⁴ once again, the effectiveness cannot yet be judged.

Meanwhile, we observe a progressive growth in the demand for mobile service. The move to small cells (including 5G) and public Wi-Fi implies smaller and less intrusive sites, but potentially a lot of them.

2.4.2 Key framework provisions regarding access to land

When a network operator wishes to deploy new infrastructure, it is normally required to negotiate directly with the owner of the land on which it wishes to carry out work. For public land, such as roads and footpaths, applications must usually be made to the relevant local authority or municipality, whereas access to private land is subject to wayleaves negotiated with the land owner.²³⁵

Until the adoption of the Framework Directive, access to public land was governed by Article 4d of Commission Directive 90/388/EEC with regard to the implementation of full competition in electronic communications markets, as inserted in 1996.²³⁶ This provision required the Member States to ensure that there was no discrimination between providers of public electronic communications networks 'with regard to the granting of rights of way' for the deployment of such networks.

²³⁴ Art. 9 Cost Reduction Directive.

²³⁵ Analysys Mason (2012), Support for the preparation of an impact assessment to accompany an EU initiative on reducing the costs of high-speed broadband infrastructure deployment p. 44.

²³⁶ Commission Directive 90/388/EEC of 28 June 1990 on competition in the markets for telecommunications services, [1990] OJ L192/10 inserted by Art. 1(6) of Commission Directive 96/19/EC of 13 March 1996 amending Directive 90/388/EEC with regard to the implementation of full competition in telecommunications markets, [1996] OJ L74/13.

The concept of ‘rights of way’ does not necessarily entail the right to start the deployment work. For example, Section 106 of the UK’s Communications Act 2003 empowers Ofcom to enable operators to benefit from certain exemptions under Town and Country Planning legislation, and to permit operators to carry out street work under the New Road and Street Works Act 1991 without needing to apply for a licence to do so.²³⁷ In many cases, however, additional permits are required before deployment work can be started. In Luxembourg, a right of way subject to the laws, regulations and administrative provisions governing the use of the public land of the State and municipalities formed part of the licence granted for the provision of an electronic communications network. In this context, the Court found in 2003 that “(e)ven if the procedures [to use rights of way applied by the various competent authorities may be obtained on request by interested parties or, in certain cases, through the internet, the fact remains that all the administrative procedures as a whole are far from transparent and that, therefore, such situation is capable of discouraging interested parties from making applications for rights of way”.²³⁸

Since 2003, access to land by ECS providers is regulated by Article 11 of the Framework Directive. For this reason, the Commission decided to abrogate Article 4d of Commission Directive 90/388/EEC. Article 11(1) is much more detailed than the former and specifies that Member States shall ensure that when a competent authority considers:

- an application for the granting of rights to install facilities on, over or under public or private property to an undertaking authorised to provide public communications networks, or
- an application for the granting of rights to install facilities on, over or under public property to an undertaking authorised to provide electronic communications networks other than to the public,

the competent authority:

- acts on the basis of simple, efficient, transparent and publicly available procedures, applied without discrimination and without delay, and in any event makes its decision within six months of the application, except in cases of expropriation, and
- follows the principles of transparency and non-discrimination in attaching conditions to any such rights.

²³⁷ See <http://stakeholders.ofcom.org.uk/telecoms/policy/electronic-comm-code/faqs/>

²³⁸ Case C-97/01 *Commission of the European Communities v Grand Duchy of Luxembourg*, ECLI:EU:C:2003:336, para 39.

Article 11 of the Framework Directive is mirrored by Article 4(1)(b) of the Authorisation Directive, which states that under the general authorisation, undertakings “*shall have the right to (...) have their application for the necessary rights to install facilities considered in accordance with Article 11 of Directive 2002/21/EC (Framework Directive)*”.

Noteworthy is that neither the wording of Article 11 of the Framework Directive nor of Article 4(1)(b) of the Authorisation Directive uses the term ‘rights of way’, but speaks instead of applications ‘for the granting of rights to install facilities’ which cover also possible administrative permits to use rights of way. This broader interpretation seems to be supported by recital 41 of the Better Regulation Directive 2009/140/EC (amending the FWD and the Authorisation and Access Directives), which seems to make clear that permits are an issue: “*Permits issued to undertakings providing electronic communications networks and services allowing them to gain access to public or private property are essential factors for the establishment of electronic communications networks or new network elements. Unnecessary complexity and delay in the procedures for granting rights of way may therefore represent important obstacles to the development of competition. Consequently, the acquisition of rights of way by authorised undertakings should be simplified. National regulatory authorities should be able to coordinate the acquisition of rights of way, making relevant information accessible on their websites. ...*”

Article 11 of the Framework Directive does not touch on the question of whether rights of way should be granted free of charge. Article 13 of the Authorisation Directive only says that when fees are imposed for the right to install facilities on, over or under public or private property, these fees must reflect “*the need to ensure the optimal use of these resources. Member States shall ensure that such fees shall be objectively justified, transparent, non-discriminatory and proportionate in relation to their intended purpose and shall take into account the objectives in Article 8 of Directive 2002/21/EC (Framework Directive)*”.

A specific problem occurs where municipalities themselves provide electronic communications networks and, at the same time, have decision-making powers on the granting of rights of way on municipal land to potential competitors. Article 11(2) of the Framework Directive addresses this issue by requiring Member States to ensure that where public or local authorities retain ownership or control of undertakings operating public electronic communications networks and/or publicly available electronic communications services, there is an effective structural separation of the function responsible for granting the rights of way from the activities associated with ownership

or control. However, the effective implementation of this obligation seems to have taken some time.²³⁹

Article 11(3) of the Framework Directive asks EU Member States to ensure that effective mechanisms exist to allow undertakings to appeal against decisions refusing them the right to install facilities to a body that is independent of the parties involved.

Where an undertaking has been granted rights of way under national law, NRAs may, under Article 12, impose obligations of co-location and sharing of network elements and associated facilities, including buildings, entries to buildings, building wiring, masts, antennae, towers and other supporting constructions, ducts, conduits, manholes, and cabinets.

Member States may require undertakings that have been granted rights of way under national law to share facilities (including physical co-location) or to take measures to facilitate the coordination of public works in order to protect the environment, public health, public security or to meet town and country planning objectives, and only after an appropriate period of public consultation during which all interested parties must be given an opportunity to express their views.

Finally, under Article 12(3), national authorities are empowered to impose obligations in relation to the sharing of wiring inside buildings or up to the first concentration or distribution point where this is located outside the building, on the same undertakings and/or on the owner of such wiring, where this is justified on the grounds that duplication of such infrastructure would be economically inefficient or physically impracticable.²⁴⁰

Such sharing or coordination arrangements may include rules for apportioning the costs of facility or property sharing adjusted for risk where appropriate. Where relevant, these measures are to be carried out in coordination with local authorities.

239 For instance, in 2006, the Netherlands updated their legislation to establish a structural separation between ownership and decision-making powers, while in Ireland, the incumbent operator was not granted rights of way in one region where the municipality intends to promote the use of local area networks (a project funded partially through Structural funds) and in Luxembourg some operators are reportedly being denied access rights in municipalities which have rolled out their own cable networks. See European Commission (2007), European Electronic Communications Regulation and Markets 2006 (12th Report), Staff Working Document, SEC(2007) 403/ Vol 1, 29.3.2007., p. 45 and 75.

240 In its reply of 1 December 2005 to the Commission Public consultation on the evaluation and the review of the regulatory framework for electronic communications networks and services, Orange notes that "Some NRAs (in particular in Portugal, France and Spain) have already and appropriately used Article 12 for applying an infrastructure sharing regime to the last segment of FTTH". "This form of infrastructure sharing regulation is efficient to ensure fair competition between fixed infrastructures and to allow pure Mobile Operators to access fixed infrastructures in the event of a fixed duopoly in order to provide convergent fixed mobile services. Orange considers that convergent fixed mobile offers will become the market standard, because fixed and mobile access provide complementary data services for end-users. If they cannot provide convergent offers, pure Mobile Operators will not be able to continue to operate, or at least be significantly marginalized". p.42. available at: <http://www.orange.com/fr/content/download/33782/1093926/version/1/file/2015+12+01+ORANGE+answer+TFR.pdf>

In addition, the provision empowers the competent national authorities to require undertakings to provide the necessary information if requested by the competent authorities, in order for these authorities, in conjunction with national regulatory authorities, to be able to establish a detailed inventory of the nature, availability and geographical location of the facilities concerned and to make the information available to interested parties.

Neither Article 11 nor Article 12 requires Member States to grant rights of way to operators of electronic communications networks. Operators of electronic communications networks thus have no blanket entitlement to obtain such rights.

2.4.3 Implementation of key framework provisions in relation to access to land

It is difficult to be definitive, because of the limited scope of Articles 11 and 12 of the Framework Directive. As mentioned above, in addition to rights of ways, administrative permits (building permits, EMF approval, and so on) are often required. In its judgment of 26 April 2012,²⁴¹ the Court of Justice could therefore find a breach of Article 11 only because the procedures for the granting of rights of way in Cyprus lacked transparency, and because the Cypriot authorities admitted delays in the granting of rights of ways for setting up mobile base stations and antennas due to overlapping competences of the authorities in charge of granting building and town planning permits. The Court would likely not have been able to find a breach of the Framework Directive if the delays had only concerned the granting of town planning permits, i.e. the administrative permits required to exercise rights of ways granted.

Feedback from ECN providers operating in various Member States and desk research suggest that conditions, rules and institutional arrangements are quite different from Member State to Member State, and can also be quite different among municipalities within a Member State.

As an indication we provide a comprehensive benchmark for three indicators:

- Time period between application and granting of rights to install facilities as defined in the law;
- Duration of rights of way; and
- Fees and charges for rights of way.

The time period between application and granting of rights should be reasonably short and predictable, but this does not seem to consistently be the case (see Table 22). Variations between Member States with regard to the time period between application and granting of rights of way set in the law are significant ranging from granting the

²⁴¹ Case C-125/09 *Commission v. Cyprus*, ECLI:EU:C:2012:239. See in particular paras 43 and 45.

rights of way automatically if conditions are fulfilled up to a maximum of 6 months. For example, in Germany there is no time period defined by law for the granting of the consent. Article 7 of the Cost Reduction Directive obliges Member States “to ensure that the competent authorities grant or refuse permits within four months from the date of the receipt of a complete permit request” other than in exceptional, duly justified cases.

Table 22: Time period between application and granting of rights of way specified in law as of February 2016

Country	Time period between application and granting of rights of way specified in law
BG	Not specified in law or supplementary acts.
DE	Not specified in law.
ES	Maximum 6 months. Source: Title II Chapter II, Article 31 (2b) of the General telecoms law of 2014
FR	Maximum 2 months from date of request to reach a decision but only for the public domain. Source: Art. L 46 of the Code of post and electronic communications (CPCE)
IT	Maximum 6 months. Source: Art. 86 of the Electronic Communications Code 259/2003
MT	Not specified in law.
NL	Maximum 4 weeks, in case of objections up to 2 months. Source: Art. 5(3) of the Telecommunications Law
PL	Maximum 30 days for contractual parties within ordinary course of business, in case of non-agreement within 30 days, UKE may set a deadline for contract to be signed within 90 days. Source: Act on Support of Telecommunications Networks and Services Development of May 7, 2010, Art. 30 (5)
SE	Maximum 4 months. Source: § 23a in of the Utility Easements Act (1972:719) came into force from July 1, 2016 as part of the measures transposing CRD.
SI	Maximum 4 months is the general deadline for administrative decisions. Source: Art. 110 of the Spatial Management Act (ZUreP-1)
SK	The real estate burdens enabling rights of way are granted automatically if certain conditions are met Source: Art. 66 (1) Electronic Communications Law.
UK	Not specified in law.

Source: Cullen International.

Some of the stakeholders whom we interviewed argued that, while the definition of a clear time period by law represents a step forward, the period of 4 months may be too long compared to the overall duration of a typical network roll-out. Some ECS providers asked for consideration of a two month period for approval of permits instead of four months; others suggested implementing a procedure where a failure by authorities to respond in a timely fashion to a complete permit request could be interpreted as consent.

The duration of rights of way depends on the type of the legal instrument used by ECS providers to establish land usage rights. There are two principal instruments available to ECS providers: (1) rental or lease agreements, and (2) easements. Some form of these two principal frameworks is available in each of the Member States, but details and definitions can vary among the Member States.

The first framework can be generally thought of as a temporary rental or lease agreement concluded between the ECS provider and the landowner, typically in return for annual payments to the landowner. The rights granted under this type of agreement are temporary in nature, and might not automatically transfer to a new owner or provider.

Another principal instrument is commonly referred as an *easement*. It provides similar access rights for installing and maintaining ECS infrastructure equipment, but for a one-off payment, and it provides permanent access. An easement can also be registered at the land registry which ensures that future property owners are obliged to comply with it.

Of the twelve Member States for which we have information, seven have explicit provisions to the effect that rights of way granted to ECS providers under easement arrangements are of unlimited duration (see Table 23).

Some Member States that do not have specific provisions on the duration of rights of way may nonetheless set out specific (and limited) conditions under which landowners may be entitled to modify or withdraw previously granted rights of way, as is the case for example in the UK.

Table 23: Duration of rights of way under easement arrangements as of February 2016

Country	Duration of rights of way
BG	Unlimited
DE	Unlimited
ES	Unlimited
FR	Not specified in law
IT	Not specified in law
MT	Not specified in law
NL	Unlimited
PL	Unlimited
SE	Unlimited
SI	Not specified in law
SK	Unlimited
UK	Not specified in law

Source: Cullen International.

In terms of promoting investment in ECNs, there is an argument that access to rights of way should be free of charge, with only administrative charges for administrative acts. As presented in the following Table 24, this is the case for example in Germany, the Netherlands, and the UK. However, it appears that local authorities sometimes use fees as if they were taxes in order to generate revenue for local government, a practice that seems inconsistent with Article 13 (on fees for rights of use and rights to install facilities) of the Authorisation Directive. ECS providers pointed to Hungary and Croatia as examples. In some countries, ECS providers also face fees as a percentage of their gross revenues or turnover, as is the case in Malta. It might be worth considering whether such a fee is reasonable and in line with Article 13 of the Authorisation Directive.

Table 24: Fees for rights to install facilities on, over or under public property as of February 2016

Country	Fees for obtaining rights of way on, over or under public property
BG	Defined on local municipality level according to the following criteria: 1. space of the servient lot, enclosed within the boundaries of the servitude; 2. types of restrictions on the use of the servient estate; 3. period of the restriction; 4. market value of the lot or of the part thereof which falls within the boundaries of the servitude.
DE	Rights of way free of charge, only administrative fees for administrative acts (€ 800 for the general certificate).
ES	Fees are set by the public administrations that are responsible for town planning, territorial organisation and environmental protection (in many instances these will be the municipalities). A special local tax is set at 1.5% of annual gross exploitation income obtained in municipalities.
FR	Rights of way of public domain, the fees are not harmonised and are set by local authorities (duration and rental value to be taken into account); maximum level set in Art. 20-52 CPCE (Code of post and electronic communications); nothing said with regard to private property.
IT	Not harmonised, determined by local authorities.
MT	For collocation of use of facilities, only charges based on reasonable relevant costs. For all public rights of way nationwide, “ <i>Any national operator that enjoys a right of way shall pay to the Authority, or to any person or body of persons to whom the Authority may delegate in writing specific functions, an annual fee for such right equivalent to 0.4% of the operator’s total gross revenues, provided that the said fee shall not be less than €279,500.</i> ” (Regulation 3 (1), S.L.499.37)
NL	No fees.
PL	Rights of way are free, but the ECS provider may need to pay the property owner or manager for access to the building, maintenance, and/or power supply.
SE	Set by the respective municipal land surveying authority. The amount is set according to the effect on the market value of the property concerned.
SI	Not specified in law
SK	Rights of way are free, but the ECS provider may need to make payments to the property owner or manager.
UK	No fees.

Source: Cullen International.

The overall large disparities seem to be problematic in terms of deployment and investment in ECNs.

- The general right to deploy is often not enforceable in practice because it conflicts with other provisions, many of which appear not to have time limits.
- Local authorities sometimes use fees as taxes to generate revenue.
- The time period between application and granting of rights to install facilities should be reasonably short and predictable, but this does not seem to consistently be the case.

2.4.4 Institutional functioning

As a general rule, rights of way to operate above-ground and under-ground communications networks are granted to electronic communications operators under national laws implementing the Framework Directive; however, national laws and regulations concerning civil works, spatial planning, environment, public health and general administration affect to a different extent the procedures for exercising rights of way and the roll-out of networks in each Member State. The outcomes of complex administrative procedures that vary greatly among the Member States involve numerous competent authorities, depending on whether requests for access rights relate to public or private property, roads, highways, railways or ports. For example, in Ireland and the United Kingdom, providers face burdensome negotiations with private landlords, while in Poland, the time it takes to grant permits is being drawn out by an increasing number of court cases.²⁴² The procedures also depend on the type of infrastructure for which requests have been submitted. Roll-out and maintenance of underground networks seems to be less problematic than the installation and sharing of masts and antennae, to which stricter environmental and public health protection rules are applied.²⁴³

Member States have divergent approaches as regards maximum authorised exposure to electromagnetic fields (EMF), causing in some cases delays in the deployment of LTE.²⁴⁴ Evidence gathered by the GSM Association shows that some of the procedures can be very lengthy. For base stations, typical timescales for planning permissions in Europe are more than 20 months in several Member States, with a tendency for these delays to increase rather than decrease over time.²⁴⁵

²⁴² See European Commission (2015), Implementation of the EU regulatory framework for electronic communications – 2015, Staff Working Document, SWD(2015) 126, 19.6.2015, p. 19.

²⁴³ See European Commission (2007), European Electronic Communications Regulation and Markets 2006 (12th Report), Staff Working Document, SEC(2007) 403/ Vol 1, 29.3.2007, p.74.

²⁴⁴ In July 2013, for example, a report commissioned by the French Ministries of Ecology and of the Digital Economy showed that lowering exposure to EMF from mobile base stations (2G and 3G) to a maximum level of 0.6V/m would significantly reduce mobile network coverage, especially inside buildings (http://www.developpement-durable.gouv.fr/IMG/pdf/rapport_COPIC_31_juillet_2013.pdf).

²⁴⁵ <http://www.gsma.com/gsmadeurope/gsma-europe-report-on-base-station-planning-permission-europe/>, quoted in European Commission (2013), Impact Assessment accompanying the Proposal for a Regulation on measures to reduce the cost of deploying high-speed electronic communications

Lastly, procedures also depend on whether requests for permits concern deployment of new networks or whether they merely relate to access to existing networks. Most of the Member States have set instructive deadlines in their legislation to ensure that decisions concerning permits are properly respected. In the event of a failure by the competent authorities to meet the deadlines, the administrative law generally provides safeguards whereby lengthy procedures can be challenged through the Courts. Member States such as Cyprus, Italy and Greece use a system of tacit approval for permits for the deployment of fixed networks, while Portugal and Romania use tacit approval for rights of way.²⁴⁶

In 2007, the Commission noted that the “... *diversity of rules across Member States can have the overall effect of rendering procedures cumbersome and less transparent, causing significant delays in the roll-out of new networks, thereby impeding the development of competition*”.²⁴⁷ On a more positive note, the Commission noted a few examples of best practice: “*The Hungarian NRA is empowered to license all electronic communications structures, but not the masts and antennae, for which it has a strong coordinating role*” and “*in the United Kingdom, operators that have prior “code” permission from the NRA simply have to notify the competent authority about their planned roadworks*”.²⁴⁸

2.4.5 The performance of RFEC provisions relating to access to land

2.4.5.1 Effectiveness

Feedback from ECN providers operating in various Member States and desk research suggest that conditions, rules and institutional arrangements are quite different from Member State to Member State, and can also be quite different among municipalities within a Member State. For example the time period between application and granting of rights of way if set in law differs significantly, the fees charged are substantially different as well as the duration of rights of way. Thus, more consistent rules could contribute to the establishment of a better internal market.

Local authorities who must make approvals have many incentives to reject, and few to approve. The decision is not necessarily neutral and objective in practice. Local authorities sometimes use fees as taxes to generate revenue. (In terms of promoting investment in ECNs, there is an argument that rights to install facilities should be free of charge, with only administrative fees for administrative acts.) The time period between

networks, COM(2013) 147, SWD(2013) 73, 26.3.2013, p. 23. Note that this proposal became the Cost Reduction Directive.

²⁴⁶ European Commission (2015), Implementation of the EU regulatory framework for electronic communications – 2015, Staff Working Document, SWD(2015) 126, 19.6.2015, p. 19.

²⁴⁷ European Commission (2007), European Electronic Communications Regulation and Markets 2006 (12th Report), Staff Working Document, SEC(2007) 403/ Vol 1, 29.3.2007, p.74.

²⁴⁸ *Ibid.*

application and granting of rights should be reasonably short and predictable, but this does not seem to be consistently the case. These observations generate a negative effect on competition and on the investment in network infrastructure which are not in the interest of the EU citizens.

Compared to the arrangements currently in operation, effectiveness could be improved by more consistency and predictability.

As noted in Section 2.4.2, the response to an “application for the granting of rights to install facilities” (the subject of Article 11 FWD, and thus of the RFEC) is not in and of itself sufficient to enable work to commence – substantial delays are still possible. The degree to which the implementation of the Cost Reduction Directive will reduce these delays in practice is unknown.

2.4.5.2 Efficiency

Pending the full implementation of the Cost reduction Directive, it is difficult to judge the effective efficiency of current arrangements in Europe.

2.4.5.3 Coherence

Article 4 of the Authorisation Directive refers to Article 11(1) of the Framework Directive and concerns rights of operators of electronic communications networks “to install facilities on, over or under public or private property”, known as rights of way. The exercise of rights of ways requires obtaining on a case by case basis permits for carrying out civil works and/or installing the network facilities concerned from the ‘competent’ authorities involved. Obtaining permits is a complex process due to the different national levels of competencies that can be concerned and the fact that different authorities may be in charge, taking a part of the ‘*effet utile*’ of the rights of way granted. During the 2015 Commission public consultation on the evaluation and review of the regulatory framework for electronic communications, a stakeholder (the Fórum pre komunikačné technológie Communication (SK)) observed that “*construction permits are difficult to achieve, proceedings are full of obstacles, vague ‘public interest’ condition in the law with no definition and no clear identification of competent authority to decide.*”

Article 7(1) of the Cost Reduction Directive foresees “that all relevant information concerning the conditions and procedures applicable for granting permits for civil works needed with a view to deploying elements of high-speed electronic communications networks ... is available via the single information point” that is required under Article 10(4) of the Directive. Once fully implemented by the national authorities, this provision should help to address numerous problems regarding the practical exercise of the rights granted pursuant to an application to install facilities.

Commission online records indicate that infringement proceedings were opened on 23 March 2016 against not less than 24 Member States²⁴⁹ in regard to delays in transposition of the Cost Reduction Directive.²⁵⁰ Directive 2014/61/EU requires all Member States to transpose the measure by 1 January 2016, and to apply the measures from 1 July 2016.

Given the delays in transposition and application, no data is yet available on the effectiveness of the Directive. A number of somewhat similar Member State initiatives that antedate the Directive, however, appear to have been effective.²⁵¹

2.4.5.4 Relevance

In terms of relevance of the framework and whether EU action is still necessary, our belief (and also the perception of interviewed stakeholders) is that the framework provisions that relate to the granting of access to rights of way are still necessary.

2.4.5.5 EU value added

Rights of way which have to be granted according to the EU provisions are essential for rolling out network infrastructure. In order to generate greater value added, the current framework would need to be enhanced to reduce the fragmentation of granting rights of way across the Member States, and to establish a simple administrative regime in which rights of way are granted at reasonable low fees (only covering administrative costs), in reasonable time and with sufficient duration (ideally unlimited).

2.4.5.6 Conclusions

Compared to the arrangements currently in operation, *effectiveness* could be improved by more consistency and predictability. Arrangements vary greatly among the Member States, and may vary significantly among municipalities within a Member State. These concerns are compounded by the fact that the right to install facilities is generally not sufficient to enable work to commence – further delay is common for reasons that are outside of the scope of the RFEC. These concerns obviously impact both the *effectiveness* and the *efficiency* of the current regime.

As regards *coherence*, the CRD is not part of the RFEC, but constitutes an important complementary instrument that is likely (based on experience with similar measures undertaken at Member State level) to have an important positive impact on the

²⁴⁹ See for instance Barros (2015), “Fostering rollout of NGA networks - Regulation of non discriminatory access to PT Ducts”, presentation to OdV workshop, Rome, 14 January 2015.

²⁵⁰ Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks.

²⁵¹ European Commission (2016), database at https://ec.europa.eu/info/law_en, viewed 24 July 2016.

operation of the RFEC in regard to the ability to deploy facilities in response to an application for access to land. Delays in transposition and implementation of the CRD are thus unfortunate, but the Commission has already taken steps to deal with delays.

The provisions in the RFEC are highly *relevant* to enabling network operators to deploy facilities. A standardised EU framework has contributed to faster and more uniform response across the Member States, thus providing *EU added value*.

2.5 End-user issues – contracts, transparency, quality of service, change of provider and out-of-court dispute resolution

This chapter assesses the end-user provisions of the electronic communications framework that deal with contracts, transparency, quality of service, change of provider and related out-of-court dispute resolution procedures.²⁵² These are provisions that are intended to promote the end-user interest, notably to provide end-users with a complete and fair contract, to enable a well-informed choice, and to facilitate switching between service providers. The end-user provisions of the framework are also intended to promote consumer choice and effective competition, notably by facilitating switching between providers. Finally, they are intended to promote the completion of the Single Market.

The chapter is structured as follows:

- Section 2.5.1 sets out major technological and commercial developments that impact on the position of end-users.
- Section 2.5.2 describes the provisions of the electronic communications framework in relation to contracts, transparency, quality of service, change of provider and related out-of-court dispute resolution procedures.
- Section 2.5.3 provides a detailed overview of the implementation of these provisions in the Member States. As the relevant EU provisions are based on minimum harmonisation, Member States may and do go beyond in various ways.
- Section 2.5.4 assesses the outcomes in Member States in terms of getting access to complete a contract, the ability to make a well-informed choice, and the ease of switching between service providers, and identifies problem areas.
- Section 2.5.5 analyses the overlap of sector-specific end-user provisions with horizontal EU consumer protection law.

²⁵² Universal Service Directive, , Arts. 20-23, 30 and 34, as amended by Directive 2009/136/EC. See consolidated version: <http://data.europa.eu/eli/dir/2002/22/2016-04-30>.

- Section 2.5.6 addresses institutional issues resulting from overlapping competencies allocated to sector regulators and consumer protection agencies.
- Section 2.5.7 assesses the framework provisions against the criteria of effectiveness, efficiency, coherence, relevance and EU value added. This section also contains overall conclusions on the framework provisions.

2.5.1 Key technological and commercial developments regarding end-user issues

Key technological and commercial developments that potentially impact on the position of end-users include:

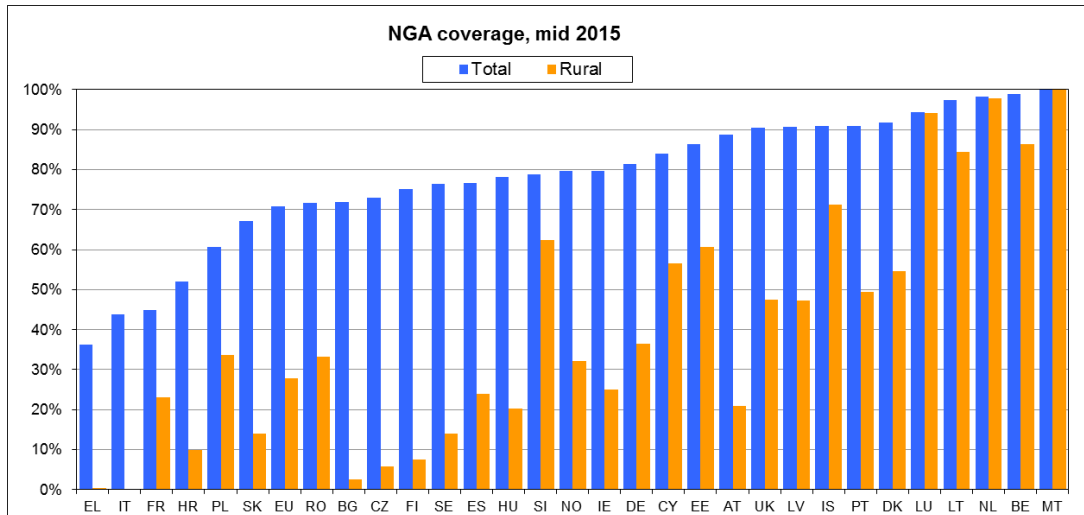
- The roll-out and take-up of very high-speed broadband that may give rise to transparency issues;
- The bundling of services affecting market transparency and switching between providers; and
- The proliferation of OTT services that rival with traditional electronic communications and broadcasting services under different consumer protection rules.

2.5.1.1 Very high-speed broadband

The most important development from an end-user perspective is the roll-out and take-up of very high-speed broadband Internet access.²⁵³ Coverage of fixed NGA technologies - FTTC/VDSL, FTTH/B and Docsis 3.0 cable – increased to 71% in mid-2015. Deployments focus on urban areas so far, while only 28% of rural homes are covered (Figure 30).

253 See also WIK-Consult (2015), European and global trends in the development of FTTB/H networks - significance for Germany (in German), Bad Honnef, October 2015 (http://www.wik.org/fileadmin/Studien/2016/VATM_FTTB_H_Netze.pdf) and WIK Consult (2016), Drivers for the rollout of high speed broadband infrastructure (in German), Bad Honnef, May 2016 (http://www.wik.org/fileadmin/Studien/2016/VATM_Hochbitratige_Infrastrukturen.pdf).

Figure 30: Coverage with fixed NGA technologies: homes passed in % of all homes, mid-2015



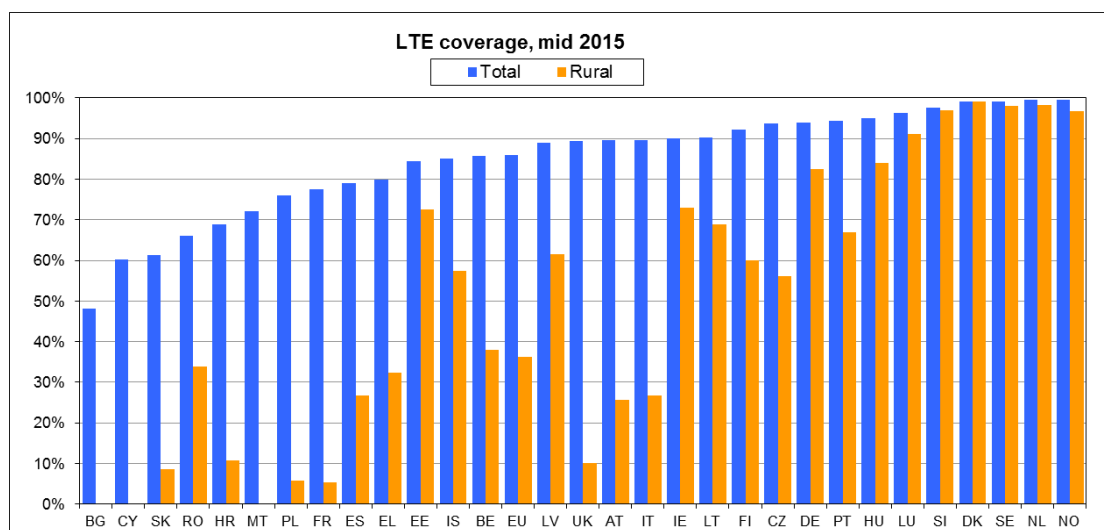
Note: NGA technologies include FTTC/VDSL, FTTH/B and Docsis 3.0 cable

Source: European Commission, broadband indicators

(http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=14329)

At this same time, mobile NGA has becoming widely available. Coverage of LTE reached more than 86% in mid-2015, with 36% coverage of rural households (Figure 31).

Figure 31: Coverage with LTE: homes covered in % of all homes, mid 2015

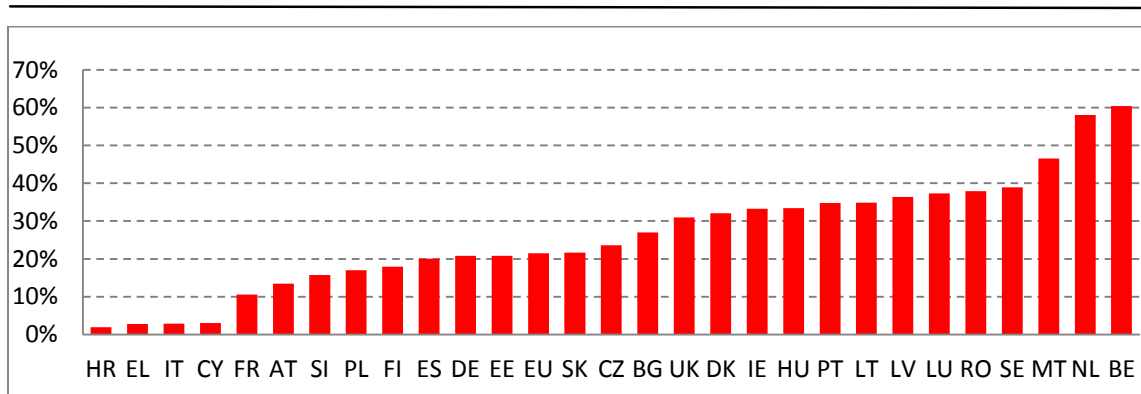


Source: European Commission, broadband indicators

(http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=14329)

While availability of fixed NGA broadband has been steadily rising, take-up is lagging behind. In July 2015, 22% of European households subscribed to a very high-speed fixed connection (30 Mbps and more) (Figure 32).

Figure 32: Penetration with NGA broadband: subscriptions in % of households, July 2015

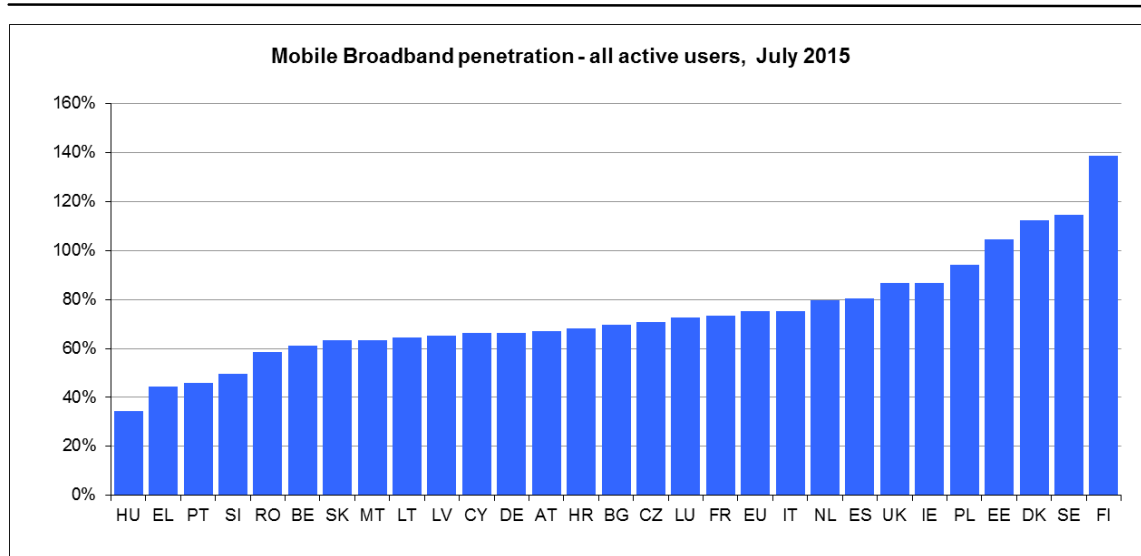


Note: NGA as defined here includes subscriptions on speeds at least 30 Mbps

Source: European Commission (2016), Europe's Digital Progress Report 2016 – Connectivity (based on Communications Committee)
http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=15807)

In contrast, take-up of mobile broadband has occurred fairly rapidly. In mid-2015, 72% of Europeans had subscribed to mobile broadband (UMTS and LTE considered together) (Figure 33). It should be noted that subscribers benefitting from mobile broadband may only have access to speeds well below 30 Mbps, depending on the technology and spectrum available at a particular location and the number of users among which bandwidth is shared.

Figure 33: Mobile broadband penetration: subscriptions in % of population, July 2015



Source: European Commission, broadband indicators
(http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=14329)

The roll-out and take-up of very high-speed broadband, while of great benefit to end-users, potentially raises a number of end-user rights issues:

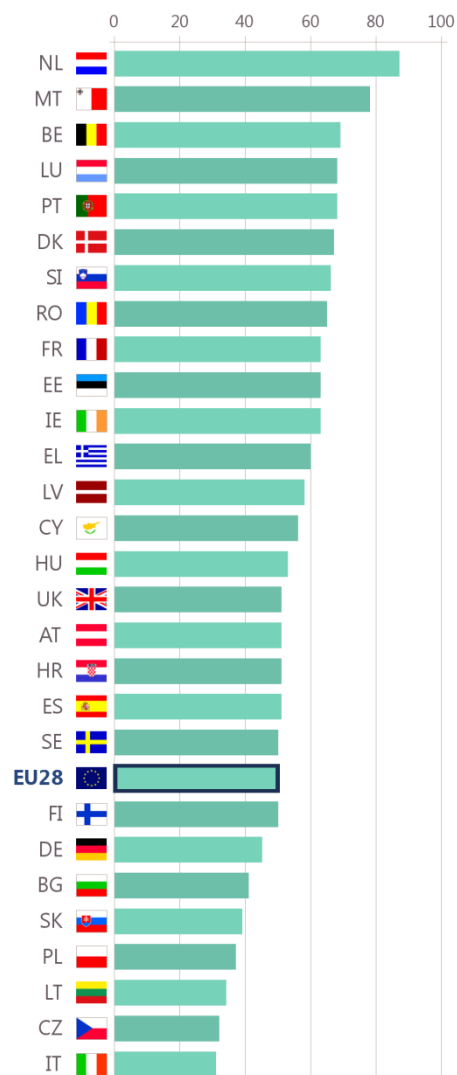
- Broadband internet access service providers may insufficiently specify in contracts their traffic management measures, speed and other quality of service parameters. This may affect the fairness of contract terms and decrease market transparency.
- Traffic management practices of internet access service providers may lead to differences in the treatment of traffic, services, content and application services providers and/or end-users, which may not be justified and could be discriminatory.
- With growing bandwidth and quality requirements, the differences between internet access service providers regarding download and upload speeds, latency and jitter can be expected to play an increasing role when end-users select a provider. Publication of quality of service data is important for enabling the end-user to make a well-informed choice.

These issues are already identified and addressed by the 2015 Open Internet Regulation, and are not further discussed in our study.

2.5.1.2 Bundling

A second major development for end-users is the bundling of services, which has significantly increased. In October 2015, 50% of European households have already subscribed to a bundle. The popularity of bundles varies significantly between Member States, from only 31% of households in Italy to 87% of the households in the Netherlands (Figure 34).

Figure 34: Share of households having subscribed to a bundle, October 2015

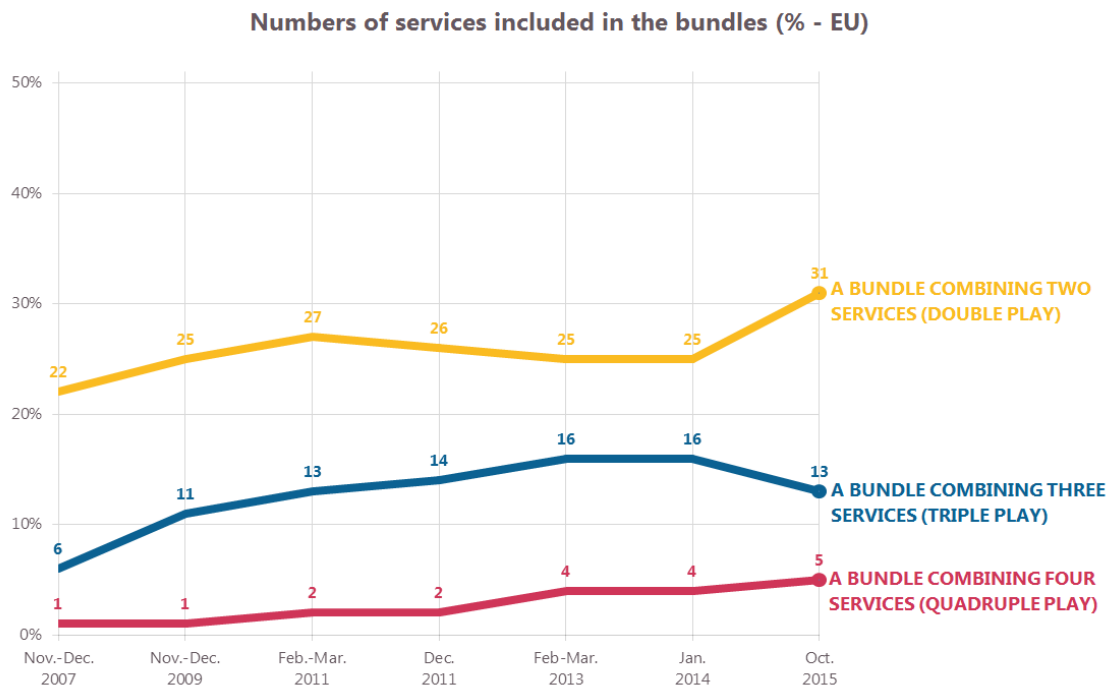


Source: European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, p. 69.
(<http://www.apdsi.pt/uploads/news/id1002/Eurobar%C3%B3metro%20438.pdf>)

Double play is the most popular variant, with 31% of households subscribing to it in October 2015. After double play reached a peak in 2011, its share slightly decreased,

but then rose further from January 2014 to October 2015. At the same time, the increase in triple play stalled and decreased from 16% to 13%. Quadruple play offerings have seen a limited but steady increase to 5% of households (Figure 35).

Figure 35: Development of multiplay bundles: share of households having subscribed to a bundle, 2007-15



Source: European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, p. 73
<http://www.apdsi.pt/uploads/news/id1002/Eurobar%C3%B3metro%20438.pdf>)

Bundles may go beyond electronic communications services. They can also include traditional broadcasting services, or extend into OTT services. Based on a study from Allot²⁵⁴, BEREC in its 2016 report on OTT services²⁵⁵ notes that the bundling of internet access with OTT services like video, music, and cloud storage has grown from 35% in 2011 to 85% in 2014. Moreover, cloud computing services are integrated into bundles. Business customers are especially likely to combine internet access with off-site data / application storage and other IT services, but more and more residential customers also have their data in ‘the cloud’.

²⁵⁴ See Allot Communications (2014), “App-Centric Operators on the Rise, Allot MobileTrends” Report H1/2014
http://www.allot.com/wp-content/uploads/RP_MobileTrends_Charging_Report_H1_2014_LR_Publish.pdf).

²⁵⁵ See BEREC (2016) “Report on OTT services”, BoR (16)35, , p.32
http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/5751-berec-report-on-ott-services).

A future driver of bundling is the convergence of fixed and mobile core and back-haul networks, which will lead to an integrated provision of fixed and mobile services.

Bundling, while often beneficial for end-users because of multiproduct discounts and convenience (single bill and integrated customer care), could potentially raise the following end-user rights issues:

- Bundling could confuse customers if elements of the bundle are subject to different consumer protection rules (due to the fact that electronic communication services (ECS) are bundled with broadcasting and with OTT services that are not ECS);
- Bundling could affect the comparability of offers, notably with regard to prices, and could decrease market transparency;
- Bundling could make switching between providers more difficult, where elements in the bundle are subject to different termination terms and switching processes. Bundling also has a strong positive impact on customer loyalty. Customer churn (% of customers leaving per unit time) may decrease with larger bundles.
- A further concern is that user data stored 'in the cloud' might limit the ability of end-users to switch to another service provider if the data cannot be ported.

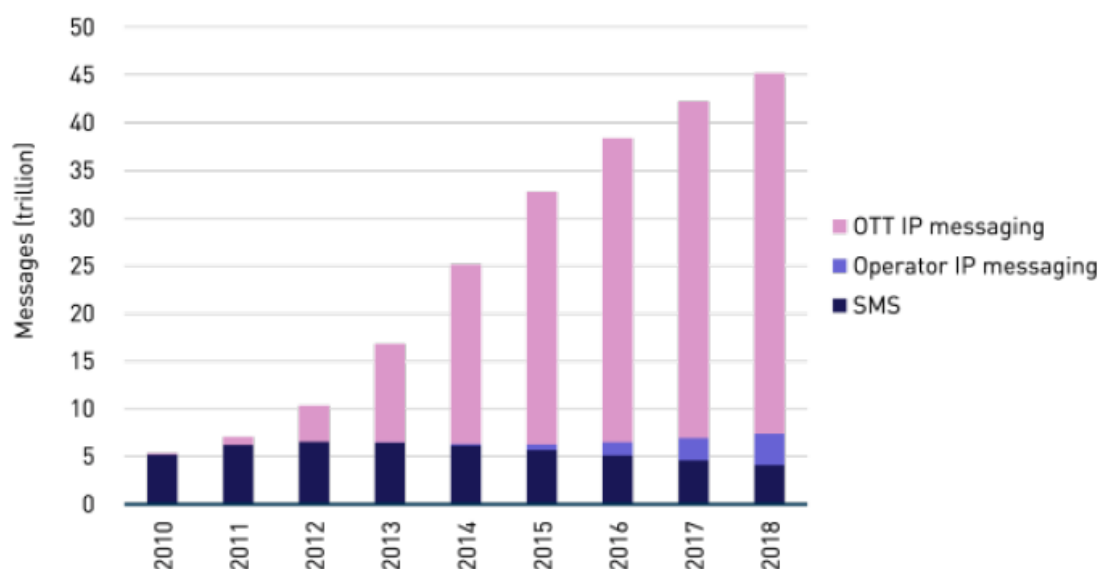
2.5.1.3 OTT services

In the last decade, OTT services such as Skype, Whatsapp, YouTube and many more have emerged (for a definition and for general considerations, see also Figure 36). Some of these OTT services now compete with traditional electronic communication services (i.e., telephony voice and SMS) and with traditional broadcasting services (i.e., linear radio and television), as noted in Section 1.5.

The development of messaging at a global level is illustrated in Figure 36, drawn from a report by Analysys Mason, which shows that while the IP messaging volume in 2010 was still negligible, it exceeded the SMS volume only three years later. OTT messaging will further increase its dominance of the messaging market in the future.²⁵⁶

²⁵⁶ Analysys Mason (2014), OTT messaging volumes will nearly double in 2014, 28 January 2014 (<http://www.analysysmason.com/About-Us/News/Insight/OTT-messaging-volumes-Jan2014-RDMV0/>).

Figure 36: Development of SMS and IP messaging: number of messages, 2010 - 2018 (forecast)



Source: Analysys Mason, OTT messaging volumes will nearly double in 2014, 28 January 2014 (<http://www.analysysmason.com/About-Us/News/Insight/OTT-messaging-volumes-Jan2014-RDMV0/>)

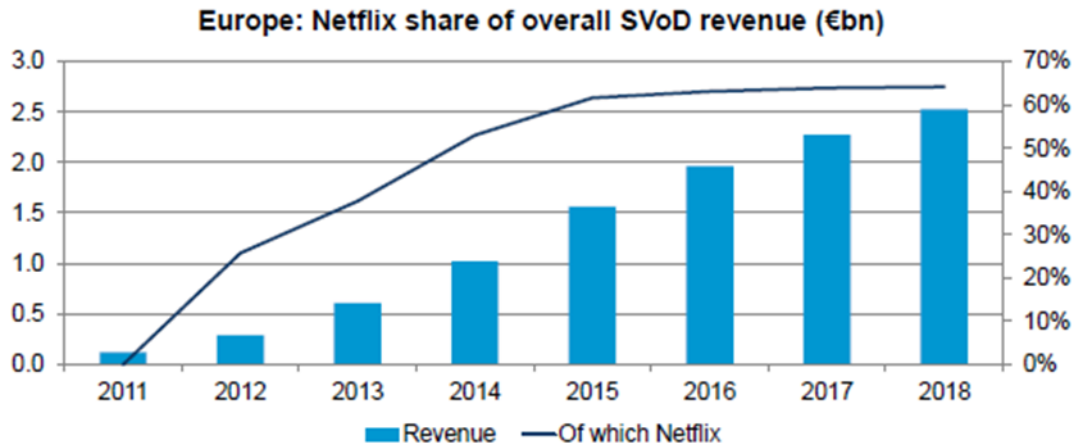
A 2016 report by Deloitte predicted that 26% of mobile subscribers would no longer use traditional mobile voice and SMS that year, but would instead use OTT services on the basis of data-only subscriptions.²⁵⁷

OTT providers focusing on video content like Netflix have also gained a significant footprint. According to IHS,²⁵⁸ Netflix has a share of more than 60% of European revenues from subscription video-on-demand (SVoD) services, which have grown substantially over the past years (Figure 37).

²⁵⁷ <http://www2.deloitte.com/content/dam/Deloitte/global/Documents/Technology-Media-Telecommunications/gx-tmt-prediction-data-exclusive-rise.pdf>

²⁵⁸ IHS (2014), The Future of Television, EBU Knowledge Exchange 2014, September 2014 (<http://www.ebu.ch/files/live/sites/ebu/files/Events/Media%20Intelligence%20Service/KX14/KX14%20-%20KEEN%20-%20The%20Future%20of%20Television%20in%20Europe.pdf>).

Figure 37: Netflix revenue and share of overall subscription video-on-demand (SVoD), 2011-18 (forecast)



Source: IHS (2014), The Future of Television, EBU Knowledge Exchange 2014, September 2014
<http://www.ebu.ch/files/live/sites/ebu/files/Events/Media%20Intelligence%20Service/KX14/KX14%20-%20KEEN%20-%20The%20Future%20of%20Television%20in%20Europe.pdf>)

The proliferation of online services, while of huge benefit to end-users, may raise end-user rights issues: OTT services such as VOIP and messaging services that are functionally similar to electronic communications services are not subject to sector-specific rules. Similarly, OTT audio and video services may be similar to radio and television broadcasting services provided over traditional broadcasting networks, but are also not subject to sector-specific rules. In both cases, while customers may expect the same consumer protection, rules may differ depending on whether a service is considered an electronic communication service, respectively a broadcasting service, or an OTT service. The difference in applicable end-user rules might cause uncertainty and confuse end-users.

2.5.2 Key framework provisions regarding end-user issues²⁵⁹

The three major policy objectives of the regulatory framework for electronic communications to be pursued by national regulatory authorities are listed in Article 8 of the Framework Directive: the promotion of competition, the development of the internal market, and the promotion of the interests of the citizens of the European Union.

Among the sub-objectives to be pursued by national regulatory authorities in the context of the promotion of the interests of EU citizens, the Framework Directive notably mentions:

- *“ensuring a high level of protection for consumers in their dealings with suppliers, in particular by ensuring the availability of simple and inexpensive dispute resolution procedures carried out by a body that is independent of the parties involved”;*
- *“promoting the provision of clear information, in particular requiring transparency of tariffs and conditions for using publicly available electronic communications services”;*
- *“addressing the needs of specific social groups, in particular disabled users, elderly users and users with special social needs” as well as*
- *“promoting the ability of end-users to access and distribute information or run applications and services of their choice”.*²⁶⁰

The obligations imposed on the providers of public electronic communications networks and services in order to protect end-user interests and rights are listed in Chapter IV of the Universal Service Directive. Certain obligations are set at EU level:

- Article 20(1) of the Directive details the clauses that contracts subscribed by consumers and other end-users must contain;
- Article 20(2) foresees that subscribers have a right to withdraw from their contract without penalty upon notice of modification of the contractual conditions;
- Article 30(1)-(4) and Annex I, Part C impose that regulators have to ensure that subscribers may, if they so wish, profit from number portability. Furthermore, it organises practical aspects of number portability like the requirement that the number shall be activated with the new undertaking within one working day and

²⁵⁹ See also the compilation presented by European Commission (2012), Code of EU Online Rights (<https://ec.europa.eu/digital-single-market/en/code-eu-online-rights>).

²⁶⁰ Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive), [2002] OJ L108/33, Art. 8(4)(b), (d), (e) and (g), as amended. See consolidated version: <http://data.europa.eu/eli/dir/2002/21/2009-12-19>.

that the loss of service during the process of porting shall not exceed one working day;

- Article 30(5) limits maximum duration of consumer contracts to 24 months and requires operators to offer users the possibility to subscribe to a contract with a maximum duration of 12 months;
- Article 30(6) requires Member States to ensure that conditions and procedures for contract termination do not act as a disincentive against changing service provider;
- Article 34 requires Member States to ensure that transparent, simple and inexpensive out-of-court procedures are available, enabling disputes involving consumers to be settled fairly and promptly.

In addition, Chapter IV of the Universal Service Directive requires the Member States to empower their NRAs:

- to impose the publication of transparent, comparable, adequate and up-to-date information on applicable prices and tariffs, on any charges due on termination of a contract and on standard terms and conditions in respect of access to, and use of, services provided to end-users and consumers in accordance with Annex II of the Directive (Article 21(1));
- to encourage the provision of comparable information to enable end-users and consumers to make an independent evaluation of the cost of alternative usage patterns. NRAs must be able to make this information eventually available themselves (Article 21(2));
- to impose the provision of information to subscribers for example on applicable tariffs regarding any number or service subject to particular pricing conditions or on the measures put in place to measure and shape traffic so as to avoid filling or overfilling a network link, and on how those procedures could impact on service quality (Article 21(3));²⁶¹
- to impose the publication of comparable, adequate and up-to-date information for end-users on the quality of services provided and on measures taken to ensure equivalence in access for disabled end-users (Article 22(1) and (2) as well as Annex III);

261 Also, Member States may require the distribution of public interest information free of charge to existing and new subscribers, and in particular information about the uses of electronic communications services for unlawful activities or for the dissemination of harmful content, including infringements of copyright and related rights, and their legal consequences; and about the means of protection against risks to personal security, privacy and personal data when using electronic communications services (Art. 21(4), Universal Service Directive).

- to set, after taking the utmost account of the European Commission's comments or recommendations, minimum quality of service requirements in order to prevent the degradation of service and the hindering or slowing down of traffic over networks (Article 22(3)).

The measures presented above refer to different categories of protected persons and undertakings. The Universal Service Directive differentiates between the following concepts as defined by Article 2 of the Framework Directive:

- An "*end-user*" is a legal entity or natural person using or requesting a publicly available electronic communications service but which does not itself provide such services or public communications networks (Article 2(h) and (n)). A "*consumer*" is any natural person who uses or requests a publicly available electronic communications service for purposes which are outside his or her trade, business or profession (Article 2(i)). All consumers are end-users, but not all end-users are consumers. The category of end-users also includes so-called "*other end-users*" such as "professional end-users" or "business users", including micro-enterprises, SMEs, or other corporate end-users. They are not defined by the Framework Directive, but they can be considered to be legal entities and/or natural persons who use or request a publicly available electronic communications service for their trade, business or profession.
- A "*subscriber*" is any natural person or legal entity that is party to a contract with the provider of publicly available electronic communications services for the supply of such services (Article 2(i)). The concept of a "subscriber" is of a different nature than the concepts of end-user, consumer, or of other end-users than consumers. The key criterion here is the existence of a contract, and not the legal status (i.e. natural person or legal entity) or the electronic communications related activity (i.e. provider or not, or whether the service is used in a trade, business or profession).

Further obligations are also foreseen in Chapter IV, which imposes a number of obligations on providers of publicly available telephone services on behalf of their subscribers, such as the right to be included in telephone directories (Article 25) or to benefit from additional facilities, such as calling line identification (Article 29 and Annex I, Part B). Article 28 requires providers of publicly available telephone services to offer access to and use of services using non-geographic numbers within the Community and access to all numbers provided in the Community, regardless of the technology and devices used by the operator. These provisions are not addressed further in the present report.

2.5.3 Implementation of key framework provisions in relation to end-user issues

The section looks at how the following sector-specific end-user protection rules have been imposed in practice in the Member States:

- Whether an obligation is imposed on service providers to provide a contract with specified terms (Article 20(1) USD);
- Whether an obligation is imposed on service providers to notify contract changes and allow withdrawal from the contract without penalty in such cases (Article 20(2) USD);
- Whether an obligation is imposed on service providers to publish information (Article 21(1) USD);
- Whether the NRA or third parties provide comparison facilities such as comparison websites (Article 21(2) USD);
- Whether an obligation is imposed on service providers to publish quality of service information; whether the NRA sets minimum quality of service levels; and whether service providers are obliged to pay penalties if they do not meet the minimum levels (Article 22 USD);
- Whether an obligation is imposed on service providers not to exceed a contract duration of 24 months as well as to offer a 12 month contract; whether and which rules are imposed in relation to early termination and roll-over contracts (Article 30(5)-(6) USD);
- Whether and which number portability rules are imposed on service providers, and whether and which rules regarding switching processes in general are imposed (Article 30(1)-(4) USD);
- Whether and how out-of-court dispute resolution processes must be made available to end-users (Article 34 USD).

2.5.3.1 Contract with specified terms

Article 20(1) USD states that Member States must ensure that contracts for electronic communication services specify certain terms clearly and comprehensively: provider identity, services provided including access to emergency services, caller location information, and other conditions limiting access to and/or use of services and applications, minimum service quality levels (the initial connection time and other defined parameters), information on procedures put in place to measure and shape traffic, type of maintenance and customer service offered, restrictions imposed on the use of terminal equipment, details of prices and tariffs including update mechanisms

and payment methods, contract duration, compensation and refund arrangements when contracted service quality is not met, dispute resolution, and lastly the actions which the provider might take in case of security or integrity incidents, threats and vulnerabilities.

Table 25 shows that all Member States oblige electronic communications providers to specify contract details, and to make them available to end-users (see the first column in the table). All Member States apply these rules to residential end-users. The second column shows that in 10 Member States, the formal requirements do not apply to all end-users (including businesses), but only to consumers. In some of these Member States, the provisions could apply to business users when explicitly requested.

Table 25: Contractual transparency at conclusion of the contract (Article 20(1) USD) as of February 2016

	Formal requirements on information to be provided to end-users at the conclusion of the contract	Same rules apply to residential and other end-users?
AT	Yes	No, the formal requirement to provide information is for residential customers only.
BE	Yes	Yes
BG	Yes	Yes
CY	Yes	Yes
CZ	Yes	Yes
DE	Yes	No, the formal requirement to provide information is for residential customers only. However, it could apply for business users as well if requested.
DK	Yes	No, the formal requirement to provide information is for residential customers only. For other end users the obligation can be waived depending on agreement between end user and provider.
EE	Yes	No, the formal requirement to provide information is for residential customers only.
ES	Yes	Yes
FI	Yes	No, the formal requirement to provide information is for residential customers only.
FR	Yes	Yes
GR	Yes	Yes
HR	Yes	Yes, except publicly procured projects
HU	Yes	Yes
IE	Yes	Yes
IT	Yes	Yes
LT	Yes	Yes
LU	Yes	Yes
LV	Yes	Yes
MT	Yes	Yes
NL	Yes	No, the formal requirement to provide information is for residential customers only. However, it could apply for business users as well if requested.
PL	Yes, including QoS data with defined minimum levels	No, the formal requirement to provide information is for residential customers only.
PT	Yes	Yes, rules may vary according to type of customer.
RO	Yes	No, the formal requirement to provide information is for residential customers only.
SE	Yes	No, the formal requirement to provide information is for residential customers only. However, it could apply for business users as well if requested.
SI	Yes	No, the formal requirement to provide information is for residential customers only. However, it could apply for business users as well if requested.
SK	Yes	Yes
UK	Yes	Yes

Source: WIK Consult/ Cullen International.

2.5.3.2 Notification of contract changes and right to withdraw

Article 20(2) USD specifies that operators must notify the customer when contract conditions are changed with a minimum notice period of one month, and that end-users have the right to cancel the contract without penalty. This aspect is addressed in Table 26.

The table shows that all Member States have imposed the obligation on service providers to notify their end-users with at least one month notice when terms and conditions are changed. Furthermore, end-users are allowed in all Member States to cancel their contract in response to such changes.

A third of the Member States (9/28) have refined this approach. If the change in the terms and conditions is to the benefit of the end-user, the service provider is allowed to implement the change with a notification time shorter than one month or with no notification at all (Austria, Denmark, France, Greece, Croatia, Luxembourg, Portugal, Sweden, and the UK). Greece seems to be the only Member State where this is explicitly defined solely in terms of price reductions. In other Member States, price reductions are mentioned as an example, but the definition of what is beneficial or not is more general ('changes clearly to the advantage of subscribers' (Denmark), or 'likely to be of material detriment' (UK)²⁶²). Portugal and Sweden have the most extensive definitions:

- Portugal: If contractual changes provide an objective advantage to the subscriber or move away from compensatory measures for early termination.²⁶³
- Sweden: If changes are obviously to the clear advantage of the subscriber.²⁶⁴ This includes reductions of the cost of use of the service as well as changes that only improve content or quality of service.

²⁶² See para. 9(6) Consolidated version of General Conditions as at 28 May 2015 (including annotations), Schedule to the Notification under Section 48(1) of the Communications Act 2003 (http://stakeholders.ofcom.org.uk/binaries/telecoms/ga/CONSOLIDATED_VERSION_OF_GENERAL_CONDITIONS_AS_AT_28_MAY_2015.pdf)

²⁶³ 48(7) Law No. 5/2004, . (http://www.pgdlisboa.pt/leis/lei_mostra_articulado.php?nid=1439&tabela=leis&so_miolo=)

²⁶⁴ See <http://www.pts.se/upload/Foreskrifter/Tele/ptsfs-2009-6-allmanna-rad-underrattelse-villkorsandring.pdf>

Table 26: Notification of contract changes and right to withdraw without a penalty
(Article 20(2) USD) as of February 2016

	Notice period for operators in case of changes to general conditions	Can subscribers cancel without penalty?	Do changes to the benefit of subscribers also have to be notified?
AT	Operators must publish changes two months in advance and must notify subscribers one month in advance.	Yes, unless all changes are for the benefit of the subscriber.	No, but only if all changes are to the benefit of the subscriber
BE	Draft measures at least one month before implementation.	Yes, within 1 month after the changes have become effective.	Yes
BG	30 days	Yes, up to 30 days after entering into force of the modification to the general terms and conditions.	Yes, any changes
CY	1 month in advance	Yes	NA
CZ	1 month (same as for subscriber)	Yes, if changes in conditions negatively affect subscriber.	Yes, but subscriber cannot cancel the contract without penalty.
DE	42 days (6 weeks in written form)	Yes	Yes
DK	1 month	Yes	No if they are clearly to the benefit of subscribers.
EE	1 month, all end-users	Yes, all end-users	Yes, all end-users
ES	1 month	Yes	Yes
FI	1 month	Yes	Yes
FR	30 days	Yes	No
GR	1 month (exception price reductions).	Yes, within 1 month from publication of changes, (except price reductions)	No for price reductions.
HR	30 days	Yes	No
HU	30 days	Yes	Yes
IE	1 month	Yes	Yes, obligation applies to "any modification"
IT	30 days	Yes	Yes
LT	1 month	Yes	Not specified. All changes to be notified.
LU	1 month	Yes	No
LV	1 month	Yes	Yes
MT	30 calendar days	Yes	Yes, if NRA agrees that changes are positive, then subscriber cannot cancel contract without penalty
NL	1 month	Yes	Yes
PL	1 month	Yes	Yes
PT	1 month, all subscribers	Yes, all subscribers	No, all subscribers
RO	At least 30 days	Yes	NA
SE	1 month	Yes	No, if changes are positive for subscriber.
SI	30 days	Yes (unless change is a direct consequence of legislation changes).	Yes
SK	1 month (same as for subscriber)	Yes, only if changes negatively impact subscriber.	Yes
UK	30 days	Yes	No, only for changes detrimental to end-users.

Source: WIK Consult/Cullen International.

2.5.3.3 Publication of information

Article 21(1) USD requires Member States to ensure that national regulatory authorities are able to impose on providers of electronic communication services the publication of transparent, comparable, adequate and up-to-date information in respect of access to, and use of, services provided to end-users and consumers.

Almost all Member States (26) have implemented measures that oblige providers of electronic communication services to publish/communicate contract details to end-users before the conclusion of the contract (see the first column of Table 27).

In two Member States where the requirements are not formalised, either the electronic communications industry has agreed on a Code of Practice (Ireland) or on a specific information table for consumers (France).

In 68% of Member States (19/28), sector-specific measures were implemented to provide end-users with transparent and comparable information (e.g. standard forms for presenting tariff or standard contracts in order to make it easy for end-user to compare services of different providers). In eight Member States, the implemented measure focuses on the elements defined in Annex II of the USD.²⁶⁵ In the other cases, the regulator seems to have focused on a particular problem when imposing the measures:

- Guidelines or Codes of Conduct on marketing practices and advertising (Denmark, Estonia, the UK), for example, specifying (in the UK) how internet service providers advertise broadband speeds and how they use the terms 'unlimited' and 'up to' in relation to speed.
- Standard manner of tariff presentation (Ireland) and standard service presentation on operators' websites (Belgium, Luxembourg).
- Presentation of the total cost over the total contract duration (Denmark) or of the mobile subscription together with the (subsidised) handset (Sweden).
- Quality of Service presentation for mobile services on the regulator's website (Poland) or an industry code on how internet speeds should be presented (Netherlands).
- Other measures such as common terms used in contracts (Portugal) or a standard format of notification in case of contract changes.

²⁶⁵ Name and address of undertaking, description and scope of services, standard tariffs and details of discounts, additional charges and costs to terminal equipment, compensation and refund policy including details of compensation/refund schemes, type of maintenance offered, standard contract conditions, dispute settlement mechanisms and rights regarding universal services.

Table 27: Publication of information by service provider (Article 21(1) USD) as of February 2016

	Formal requirements on information to be provided to end-users before the conclusion of the contract	Further sector specific measures implemented to facilitate transparency and comparability
AT	Yes	Yes
BE	Yes	Yes
BG	Yes	Yes
CY	Yes	No
CZ	Yes	No
DE	Yes	No
DK	Yes	Yes, requirements to provide comparable total payments within binding contract period and guidelines on best marketing practices
EE	Yes	Yes, Code of Conduct on Advertisements in the field of electronic communications
ES	Yes	No (but intended in near future)
FI	Yes	Yes, obliged use of standard terms
FR	No	Yes, industry agreed on standard format information table
GR	Yes	Yes, detailed provisions for info to be provided at a minimum to consumers
HR	Yes	Yes, publication of price list covering voice and data
HU	Yes	Yes
IE	No	Yes, code of practice for tariff presentation
IT	Yes	Yes
LT	Yes	No
LU	Yes	Yes, website based descriptions ("fiches signalétiques")
LV	Yes	No
MT	Yes	No
NL	Yes	Yes, tariff information to be provided on the operators' website.
PL	Yes	Yes, NRA web has a dedicated section on QoS
PT	Yes	Yes, common terminology for contract and pre-contract information
RO	Yes	No
SE	Yes	No
SI	Yes	No
SK	Yes	No
UK	Yes	Yes, advertising Code in regard to internet access service

Source: WIK Consult/Cullen International.

2.5.3.4 Comparison facilities

Article 21(2) USD requires NRAs to encourage the provision of comparable information on services. The following two tables indicate how NRAs have encouraged the provision of comparable information in order to enable end-users to make an informed choice. Table 28 provides an overview on service comparison facilities, while Table 29 deals with comparison facilities for prices.

The analysis of service comparison facilities shows the following:

- Almost all Member States (27 out of 28) benefit from either service or tariff comparison facilities operated either by the NRA or by third parties (that we were able to identify). The exception is Bulgaria, which has no service or tariff comparison website either by the NRA or by third parties.
- The scope of the services covered and the service parameters compared vary greatly.
- In roughly half of the Member States, there is an explicit focus on tariff comparison of bundles.
- In the majority of the Member States, NRAs offer the comparison websites themselves (19 out of 28 for services and 16 out of 28 for the tariffs).
- Overlap between NRA and third party websites is minimal; in many instances, either the NRA manages a website, or third parties do so. When the NRA and third parties both have comparison facilities/websites, there is often a division of function and labour in the services compared, where for instance the NRA provides the price comparison while the third party provides the speed comparison. Only in Denmark is there is a clear overlap: both the NRA and third parties provide comparable service information on broadband availability and speed. With regard to tariff information, there is an overlap in Denmark on broadband prices as well; however, the prices for fixed and mobile voice are provided by third parties only.
- Accreditation of third party data by the NRA is typically done on the NRA's own website (if it is done at all).

Table 28: Provision of comparison facilities on service (Article 21 USD) as of February 2016

	Existence of NRA monitored <u>service</u> comparison facilities (e.g. network coverage, internet speeds)			
	By NRA	By third party	Service scope	NRA accreditation
AT	Yes, RTR provides only speed monitoring tool at website	No	NA	No
BE	Yes, via website (meilleurtarif.be). Coverage, monthly volume of data downloaded, speed	No	Fixed/ mobile/ broadband/ voice /packs	NA
BG	No	No	NA	No
CY	Yes, website	No	Fixed broadband	Yes
CZ	Yes, LTE coverage	Yes, broadband speed (NetMetr)	Fixed/mobile broadband	No
DE	Yes	No	Fixed/mobile broadband	NA
DK	Yes, broadband availability and speed	Yes, broadband availability and speed	Fixed broadband	Yes

	Existence of NRA monitored <u>service</u> comparison facilities (e.g. network coverage, internet speeds)			
	By NRA	By third party	Service scope	NRA accreditation
EE	Yes, ETRA website	No	Mobile broadband only	NA
ES	Yes, quarterly publication of comparable KPIs' QoS	Yes, data on ADSL offers	ADSLzone: fibre/ ADSL and convergent offers	No
FI	No	No	NA	NA
FR	Yes	No	Fixed/Mobile	NA
GR	Yes	No	Fixed broadband	NA
HR	Yes, via website Hakom - fix/mob voice	Yes, by website Hrvatski Telekom-fixed/mobile BB	Fixed/mobil voice + broadband	No
HU	Yes, speed test website	No	Fixed/mobile broadband	NA
IE	No	No	NA	NA
IT	No, AGCOM provides link to coverage /speed info from operators for basic levels (but proposed website)	No	Proposal: Fixed, mobile and fixed-wireless broadband	NA
LT	Yes	Yes, fixed/mob internet speed tests are available on many internet access providers websites	Fixed/mobile internet access (+ coverage maps)	No
LU	Yes	No	Any services offered to consumers	NA
LV	Yes, SPRK manages website with internet speed tool	No	Fixed/mobile broadband	NA
MT	No	No	Not applicable	NA
NL	No	Yes	Fixed/mobile broadband	NA
PL	Yes, Broadband coverage and QoS portal:	Yes, multiple	TV, internet (fixed/mobile), telephone (fixed/mobile), packages	Yes, UKE regularly certifies operators and comparative portals
PT	Yes , internet speeds	Yes, Information on mobile coverage	Internet speeds, mobile network coverage	Yes
RO	Yes	No	Fixed/mobile broadband	NA
SE	No	Yes, BB speedtest	Fixed/mobile broadband	Yes
SI	Yes, manages internet speed website	No	Fixed/mobile broadband	NA
SK	No	Yes	Fixed/mobile broadband	No
UK	Yes, mobile coverage maps	Yes, internet speeds	Mobile service coverage/internet speeds	Yes

Source: WIK Consult/Cullen International.

Table 29: Provision of comparison facilities on prices (Article 21 USD) as of February 2016

	Existence of NRA monitored tariff comparison tools			
	By NRA	By third party	Service scope	NRA accreditation
AT	No	No, RTR links to some tools, but does not monitor them	NA	NA
BE	Yes, via website (meilleurtaarif.be). Information about this service, including a link, must appear on the first page of every invoice.	Yes: mesfournisseurs.be / (and more)	Fixed/ mobile/ broadband/ voice/ pack	No
BG	No	No	NA	NA
CY	Yes, website-based OCECPR tariff comparison tool	No	Fixed, mobile, broadband (fixed or mobile), bundles	NA
CZ	Yes, price barometer	Yes	Mobile and fixed voice, mobile and fixed broadband	Yes
DE	No	Yes	Fixed and mobile voice / broadband	No
DK	Yes, broadband price guide	Yes, fixed and mobile voice and broadband	Fixed and mobile broadband	No
EE	Yes, ETRA website	No	Fixed/mob voice, fix/mob BB, mob roaming, bundled services	NA
ES	No	Yes, ADSL prices	Fix/mob BB, fix/mob telephony including bundles	No
FI	Yes, no tool, but regularly published retail price benchmarks	Yes	Mobile voice	No
FR	No	Yes	Fixed and mobile voice / broadband	No
GR	Yes, EETT tariff comparison tool	No	Fixed, fixed/mob BB, mobile, tv and all bundle combinations.	NA
HR	Yes, Hakom website	No	Fixed and mobile voice. Fixed and mobile broadband	NA
HU	Yes	Yes	NRA: fix/mob voice. Third party: fix/mob voice, fix/mob BB, TV, bundled offers	No
IE	Yes	No	Fixed, mobile, broadband and bundles	NA
IT	No, but AGCOM obliges operators to publish min tariff info for fix/mob voice. Proposed AGCOM website	Yes	Fixed and mobile voice and broadband, pay-TV	Accreditation of third-party providers not mandated but possible
LT	Yes	No	Fixed and mobile voice, SMS, MMS and data (bundles are usually compared)	NA
LU	Yes	No	Any services offered to consumers	NA
LV	No	Yes	Fixed and mobile voice, fixed and mobile broadband,	No

	Existence of NRA monitored tariff comparison tools			
	By NRA	By third party	Service scope	NRA accreditation
			TV, bundled offers	
MT	Yes	No	Fixed, mobile, broadband and bundles (telephony, internet and TV)	NA
NL	No	Yes	Mobile voice, fixed and mobile internet, triple play (telephony, internet and TV)	No
PL	No, Only selected information available (for past period) in annual Reports UKE	Yes, www.CyfrowyDora dca.pl	TV, internet (fixed/mobile), telephone (fixed/mobile), packages	Yes, UKE regularly certifies operators and comparative portals
PT	Yes	No, only information on coverage by mobile operators	Internet, mobile, fixed, television, bundles	No
RO	Yes	No	All operators	NA
SE	No	Yes	Fixed and mobile, voice and broadband	No
SI	Yes	No	Fixed and mobile voice/broadband, TV	NA
SK	Yes	Yes	Fixed BB services	No
UK	No	Yes	Mobile /broadband services	Yes

Source: WIK Consult/Cullen International.

2.5.3.5 Quality of service

Article 22 USD stipulates that Member States should enable NRAs to take measures regarding quality of service (QoS). NRAs may require operators to publish QoS information to the benefit of end-users. NRAs may also specify QoS parameters and set minimum standards (on undertakings providing public communications networks).

Table 30 summarises the QoS provisions in place in the Member States:

- In several countries, there are specific QoS obligations that apply only to designated USO providers (either the obligation to publish and/or setting minimum standards apply only to USO providers in AT, BG, HR, CY, CZ, DK, FI, FR, GR, IE, IT, LV, LT, MT, PT, SI, UK). These are not covered in Table 30, as it shows only general QoS requirements that apply to all ECS providers.
- In roughly half of all Member States operators are obliged to publish QoS information related to mostly fixed and mobile broadband, and mobile voice (and in some cases also fixed voice).

- However, in half of the Member States where publication of QoS info is not mandated, there are other measures in place to stimulate the availability of this data. There are only 7 Member States which have no QoS measures implemented at all.
- Minimum QoS standards are set in only eight Member States, primarily for specific services (such as broadband delay, or call centre services).
- Where rules are implemented, they typically apply to consumers and other end-users. However, in Belgium, Romania and Sweden, QoS rules apply only to consumers.
- Overall, a variety of approaches is observed, from NRAs collecting data and publishing it on their own website to operators publishing it and NRAs validating or describing the measurement methods or applying audits ex post.
- There is significant variation in penalties, from no penalties to specific penalties (UK). There can also be reliance on other penalty mechanisms.

Table 30: Quality of service (Article 22 USD) obligations that apply to all ECS providers as of February 2016

	Relevant services	Obligation to publish service quality indicators?	Minimum QoS targets?	Measurement validated by the NRA?	Penalties apply when targets not met?	Same rules for consumers and other end-users?
AT	Fixed/mobile telephony + broadband	(Yes), applicable law for all operators, however not implemented by the NRA (adopted no secondary legislation)	No	No	NA	NA
BE	Fixed/mobile telephony + broadband	Yes, all operators (even MVNOs) with more than 40.000 subscribers	No	Yes	NA	only for the consumer
BG	Fixed/mobile telephony + broadband	No	Yes	Yes	Yes, in compliance with ECA.	Yes
CY	Mobile telephony	Yes	Yes, all operators	No	Yes	Yes
CZ	Fixed broadband	No, but NRA published guidelines to measure quality of Internet	No	No	NA	NA
DE	NA	No	No (all operators)	NA	NA	NA
DK	Fixed/mobile broadband	No	No	No	NA	Yes
EE	All services	No, but methodology of measurements of some services determined by ETRA (e.g. data communications)	No.	Yes	Yes.	No, additional rules supporting special need users
ES	Mobile	Yes, operators exceeding € 20m of annual turnover in the provision of public mobile internet access	No	NA	NA	NA
FI	Fixed/mobile telephony+ broadband	No, but operators must set network KPI's and compile annual statistics including client assistance calls and broadband speed.	Only for broadband delay	No, but operators must document all measures related to monitoring and measuring QoS	Administrative sanction for non-compliance with law + compensation to end-users	Yes
FR	Mobile voice + fixed/mobile broadband	Yes	Yes for mobile voice/broadband	Yes	No	Yes

	Relevant services	Obligation to publish service quality indicators?	Minimum QoS targets?	Measurement validated by the NRA?	Penalties apply when targets not met?	Same rules for consumers and other end-users?
GR	Mobile voice + fixed/mobile broadband	Yes	No	No	Yes	Yes
HR	Mobile voice + fixed/mobile broadband	Yes	No	Yes	NA	Yes
HU	Fixed/mobile telephony + broadband	Yes, all ECS providers with more than 1000 subscribers have to publish target network QoS indicators	Yes, all ECS providers are obliged to set QoS targets	No, but certification mechanism in place	No	Yes
IE	Fixed telephony	Yes, Eircom published quality of service publications	No	No, ComReg reviews performance ex post	NA	Yes
IT	Fixed/mobile telephony + fixed/mobile broadband	Yes, operators must measure, publish and send to AGCOM information on QoS indicators, but set the targets themselves (except for call centre services). Mobile broadband; operators do not need to set targets for mobile broadband	Call centre services: Yes Other services: no	Call centre services: Yes Other services: No	No, but compensation to end-users set (€ 2,5/day if QoS lower than stated or € 5/day in case of complete service disruption)	Yes
LT	Mobile telephony + fixed/mobile internet access	No, RRT independently measures and publishes quality indicators on its website	No	Yes, RRT is involved in measuring performance and the related audit	No	Yes
LU	NA	No, possibility foreseen in the law. Not applied in practice	No	Yes	Not specified	Yes
LV	Fixed telephony + fixed broadband	Yes, all operators must publish service quality declarations both for voice and internet services twice a year. Operators must include basic quality indicators in their agreements.	Yes, SPRK uses ITU standards for voice service quality + guidelines on minimum internet access speed and quality	Yes, SPRK performs regular and case by case quality tests to determine compliance	No	Yes.
MT	Fixed telephony	No	No	No	NA	NA
NL	Fixed broadband	Yes, ACM to establish data for publication on the ISP website	No	No	As per contract	Yes

	Relevant services	Obligation to publish service quality indicators?	Minimum QoS targets?	Measurement validated by the NRA?	Penalties apply when targets not met?	Same rules for consumers and other end-users?
PL	Fixed/mobile telephony+ broadband	Yes	Yes, all joining Memorandum	Yes	No, however, comp & consumer authority can penalise	Yes
PT	Fixed/mobile telephony+ broadband	Yes	No	Yes	No	Yes
RO	Fixed/mobile telephony	Yes, only administrative parameters – the trouble repair term, the service provision term and the complaint settling term	No	No	No	For mobile, consumers only
	Fixed/mobile broadband	Both technical and administrative parameters	No	No	No	Yes
SE	Fixed/mobile telephony + broadband	No, but obligation to provide NRA with QoS information (availability 112, helpdesk, fault repair, coverage etc)	No	Yes, but only for mobile coverage	NA	No, only for consumers.
SI	Telephony	No	No	No	NA	NA
SK	Fixed/mobile broadband	Yes, ISP obliged to publish information about internet services max and min speed, data cap, speed after data cap is reached, measures associated to traffic management	No	No	No	Yes
UK	NA	No	No	Not applicable	NA	NA

Source: WIK Consult/Cullen International.

2.5.3.6 Contract duration and termination

Article 30 USD deals with obligations for Member States to facilitate change of provider. Article 30(5) USD comprises rules regarding the maximum contract duration of 24 months (with the option to subscribe to a 12 month contract). Furthermore, Article 30(6) USD stipulates that Member States should ensure that conditions and procedures with regard to contract termination should not act as a disincentive against changing service provider.

Table 31 shows how Member States have implemented these provisions:

- Almost all Member States have implemented the 24 months maximum contract and the option to have a 12 month contract, except for Spain which has neither of them. Denmark has no 12 month contract, but the reason is that 6 months is set as maximum contract period.
- After the initial contract term, the contract may be automatically renewed in most of the Member States (21). Some Member States (7) have added a rule that after renewal of the initial contract, the renewed contracts can be cancelled any time, or else with notice of 1-2 weeks. However, the notice period for contract renewal is still a month in 10 Member States.
- When the contract is renewed, only a minority of Member States (5) have implemented rules on a maximum renewal duration, which varies between 6 and 24 months. This typically correspond to the maximum initial contract duration.
- Most of the Member States (17) have not implemented a maximum penalty when leaving the contract before the contract expires; however, nine of these Member States have implemented some form of end-user protection (such as limiting penalties to the remaining subscription fees).
- For the subsidised handset, most Member States (19) have not explicitly implemented a maximum compensation for customers terminating their mobile contract before the contract duration has expired. However, three of these Member States have rules in practice, which typically amount to the proportional remaining subsidised amount on the handset (Greece, Latvia). In Denmark, the maximum contract duration of 6 months determines the maximum number of outstanding payments to be made by the end-user; alternatively, the sale of the handset should be covered by a separate credit agreement (which might last longer than 6 months). The other nine Member States, which do have a formal maximum, almost all use a linear proportional residual subsidy amount; hence if a handset of € 240 is fully subsidised and given for free with a 24 months contract and the end-user terminates the contract after 18 months, the residual handset subsidy to be paid is 6 x € 10.

Table 31: Contract duration and termination (Article 30(5)-(6) USD) as of February 2016

	Initial commitment period (residential users)				After initial commitment period		
	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Maximum penalty regulated for early cancellation?	Maximum compensation regulated for subsidised handset?	Automatic renewal (roll-over) allowed?	Maximum allowed renewal duration regulated?	Notice period to terminate the contract regulated?
AT	Yes, for consumer contracts	Yes (consumers)	No, general civil law applies	No, general civil law applies	No, general civil law applies	No, general civil law applies	No, general law applies (1 month for consumers)
BE	Yes	Yes	Yes, free of charge after first 6 months. Before 6 months, maximum amounts to remaining subscription for first 6 months (consumers only)	Yes, linear residual value of the equipment when cancelling before contract end (consumers only)	Yes	Yes, permanent	Any time
BG	Yes	Yes	Yes, remaining subscription fee until contract term expiry, however operators agreed to reduce this to maximum 3 months.	No	No only after agreement with customer	Yes, 12 months	30 days
CY	Yes	Yes	Yes, remaining subscription periods until contract end	No	Yes, but renewal information should be provided during the initial contractual agreement	No, unregulated, however subject to the 24 month maximum period	Any time
CZ	Yes	Yes	Yes, 20% of the sum of remaining monthly fees	No	Yes	No, Market practice is 12 months	1 month
DE	Yes	Yes	No, in practice 50% of remaining contract term	No	Yes	No, in practice, the same period as the initial commitment period.	No, in practice, 1 month for fixed and 3 months for mobile (exception, 3 months when customer has moved)

	Initial commitment period (residential users)				After initial commitment period		
	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Maximum penalty regulated for early cancellation?	Maximum compensation regulated for subsidised handset?	Automatic renewal (roll-over) allowed?	Maximum allowed renewal duration regulated?	Notice period to terminate the contract regulated?
DK	Yes, 6 months	No	No, in practice remainder of the contract	No, In practice, either the outstanding payments for the handset up to 6 months; or the sale of the handset should be covered by a separate credit agreement separate from the service contract (could be longer than 6 months).	Yes, After 6 months, right to cancel the agreement with 1 month notice.	Yes, 6 months – same as the initial commitment period	1 month
EE	Yes	Yes	No	No	Yes	Yes, 12 months	Reasonable notice period
ES	No	No	No	No	No	No	Minimum 2 working days
FI	Yes	Yes	No, in practice remainder of the contract	Yes, remainder of the contractual obligations and “other agreed costs”.	Yes	No, after the initial term, the contract becomes open-ended	2 weeks
FR	Yes	Yes	Yes, maximum one quarter of original contract	No	Yes	No	10 days
GR	Yes	Yes	No, in practice 2 months for fixed telephony, for bundles remainder of the contract.	No, in practice linear depreciated amount of subsidy.	No, but general conditions for renewal should be included in the initial contract	No, but subject to the 24 month maximum period	No, in practice for fixed 7 days, for ADSL 30 days
HR	Yes	Yes	Yes, remaining subscription periods	No	Yes	No, subscriber can set termination date in contract	Any time
HU	Yes	Yes	No, penalty is not allowed, but any given discounts can be reclaimed	Yes, pro rata subsidy amount	No	Yes, same as initial commitment (24 months)	At least 30 days, but no more than 60 days

	Initial commitment period (residential users)				After initial commitment period		
	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Maximum penalty regulated for early cancellation?	Maximum compensation regulated for subsidised handset?	Automatic renewal (roll-over) allowed?	Maximum allowed renewal duration regulated?	Notice period to terminate the contract regulated?
IE	Yes	Yes	No	No	Yes	No	No, but general rule; shall not act as a disincentive to a consumer to changing service provider
IT	Yes (for businesses might be longer)	Yes	Yes, penalty to be justified by the operator, based on costs	Yes, maximum fee equal to 50% of the handset subsidy. No compensation may be charged 18 months after the purchase.	Yes	No	30 days
LT	Yes	Yes	Yes	Yes	Yes, after initial period, contract automatically becomes permanent	No	For indefinite contracts, anytime with 5 days notice period
LU	Yes	No	Yes, remaining subscription fees must be paid until the end of the contract	No	Yes	No	1 month
LV	Yes	Yes	No, penalty must be proportional and balanced with the time remaining until the contract expiration date	No, compensation must be proportional to the time remaining until the contract expiration date	Yes	No	1 month
MT	Yes	Yes	Yes, Charges shall be justified and reasonable.	Yes, subsidy/benefit of the handset provided for free must be calculated in proportion to the remaining contractual period.	Yes	No	No, in practice 30 calendar days

	Initial commitment period (residential users)				After initial commitment period		
	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Maximum penalty regulated for early cancellation?	Maximum compensation regulated for subsidised handset?	Automatic renewal (roll-over) allowed?	Maximum allowed renewal duration regulated?	Notice period to terminate the contract regulated?
NL	Yes	Yes	No, in practice remainder of contract	No	Yes, free cancellation after the automatic renewal.	No	1 month
PL	Yes	Yes	Yes, proportional remaining value of the total discount given (not applicable when contract not started or when T&C change).	Yes, proportional remaining value of handset subsidy.	No, but details should be defined in contract.	No	No
PT	Yes, consumers only	Yes	No	Yes	Yes	No, but implicitly not more than 24 months (consumers only)	No, but general rule not excessively burdensome
RO	Yes	Yes	No	No	Yes	No	No
SE	Yes	Yes	No, in practice remainder of the contract	No	Yes	No	1 month
SI	Yes	Yes	No, general rule; conditions and procedures for termination should not discourage switching	Yes, pro rata of the equipment value, depending on remaining contract duration	Yes	No	No
SK	Yes	Yes	No	No	Yes	Yes, 24 months	1 month
UK	Yes	Yes	No, but guidance that penalty should be fair	No	No	No	No

Source: WIK Consult/Cullen International.

Locking subsidised handsets²⁶⁶ can be a method for operators to ensure the recovery of the subsidy during the contract duration. Table 32 shows the maximum period for which mobile operators are allowed to lock handsets and which period is actually used. Table 32 also shows whether a maximum unlocking fee is set.

The following results are visible in Table 32:

- The majority of Member States (20) have no regulation on SIM locking in general, on the maximum period of locking, or on the maximum fee for unlocking.
- Only 6 Member States have set a maximum period for SIM locking varying from 6 months to 18 months, or in some Member States the initial contract period.
- In practice, many mobile operators still apply SIM locking (in 15 Member States), but it does not extend beyond the maximum initial contract duration.
- When the initial contract period expires, only in Sweden are operators obliged to automatically provide the unlock code to end-users. In all other Member States, the end-user has to request the unlock code.
- The SIM unlocking fee is also not regulated in general (only 4 Member States). Where regulated, a linear repayment schedule of the applied subsidy is typical.
- In practice, mobile operators charge SIM unlocking fees depending on remaining duration of the contract, and varying from € 8 to € 150 (Austria and Luxembourg having the highest fees of up to € 150).

266 Mobile handset with locked SIM cannot be used with the SIM card of another mobile operator.

Table 32: Rules on SIM locking as of February 2016

	SIM locking				SIM unlocking fee		
	Regulation on SIM locking	Maximum period to lock handset under the law	MNO practice (in months)	Operators automatically have to send unlocking codes after the SIM lock period	Maximum fee to unlock handset	Fee MNOs apply in practice	Unlocking fee imposed on top of early contract termination fee
AT	No	NA	Gradually no SIM locking anymore since 2014, but A1 still has unlock fee	NA	NA	A1 Telekom Austria: € 150 in first 12 months, € 100 in months 13 to 24, € 50 after 24 months	A1 Telekom Austria: Yes, others no fee
BE	No	NA	There is no SIM locking and handset subsidies offer are very limited in Belgium (used to be forbidden)	NA	No	NA	Operators are allowed to ask for an early termination fee corresponding to the remaining price of the device. Repayment table part of each contract
BG	No	NA	M-Tel and Telenor implement SIM locking of handsets for the term of the contract	No, the end-user has to apply for SIM unlocking at a shop of the MNO when the term of the contract expires	NA	One of the MNOs charges approximately 10% of the handset price only if the contract term has not expired or where the handset is not fully paid	Yes
CY	No	NA	No	NA	NA	NA	NA
CZ	No, but mobile operator obliged to unlock for police	Unregulated	No SIM locking	No	No	No	No
DE	No	NA	24 months	No, end-users can obtain it on the provider's website after the initial locking period has ended	NA	DT, Vodafone, Telefonica € 100	Yes

	SIM locking				SIM unlocking fee		
	Regulation on SIM locking	Maximum period to lock handset under the law	MNO practice (in months)	Operators automatically have to send unlocking codes after the SIM lock period	Maximum fee to unlock handset	Fee MNOs apply in practice	Unlocking fee imposed on top of early contract termination fee
DK	Yes, does not apply for pre paid subscribers	Yes, same as initial commitment period	In practice, MNOs in Denmark have stopped to use SIM locking	No, only if explicitly requested by subscriber	No	In practice, handsets are no longer SIM locked by MNOs	NA
EE	No	NA	Not applicable	NA	NA	NA	NA
ES	No, SIM locking is considered as abusive practice	NA	18 months, however, all MNOs now offer some contracts with unlocked handsets	NA	NA	All MNOs unlock handsets for free	Yes
FI	Yes	Yes, equal to the contract term	24 months, i.e. the max. fixed-term contract period	No, on request of the user	No	DNA: free by SMS and email (€ 10 by letter), Sonera locking no longer used,	Yes, user can terminate fixed-term contract with a subsidised handset if remainder of the contractual obligations and "other agreed costs" are paid.
FR	Yes	Yes, 6 months	In practice, most handsets are no longer SIM locked in France	No	No	In practice, most handsets are no longer SIM locked by MNOs	NA
GR	No	NA	No	NA	NA	No	NA
HR	Yes	Yes, for prepaid : after 12 months. For post paid mobile, same as the initial contract period	Pre paid: 12 months post paid: 24 months	No	Free of charge	Free of charge, but pre-paid subscribers have to show the original invoice for the purchase of the mobile phone	NA
HU	No	nao	24	NA	NA	From € 8-50, depending on the year in which exited	Yes

	SIM locking				SIM unlocking fee		
	Regulation on SIM locking	Maximum period to lock handset under the law	MNO practice (in months)	Operators automatically have to send unlocking codes after the SIM lock period	Maximum fee to unlock handset	Fee MNOs apply in practice	Unlocking fee imposed on top of early contract termination fee
IE	No	NA	Depends on length of contract	NA	NA	Free after contract end covering the payments in the contract commitment period	No
IT	Yes	Yes, 18 months	18, in practice only H3G locks handsets	No, end-user must send a request to the operator. The operator will then send instructions on how to unlock the handset	Yes, after 19 months without fee. After 9 months, maximum fee is 50% of the handset subsidy	H3G: max. 50% of the handset subsidy if unlocking requested between nine and 18 months from purchase	Yes, however operators must justify all fees based on costs.
LT	No	NA	At least the initial contract period. In practice only 1 operator locks some handsets	NA	NA	NA	NA
LU	No	NA	24 months	NA	NA	From 0 (Post Telecom), Orange € 50 to Tango (€ 150)	Yes
LV	No	NA	In practice, most handsets are not simlocked in Latvia	NA	NA	In practice, most handsets are not simlocked in Latvia	No
MT	No	NA	In practice, MNOs do not lock handsets	NA	NA	NA	No
NL	No	No, but period of 12 months agreed among operators and NRA after a court ruling in March 2002	12	NA	NA	Charges vary per handset. Unlocking by third parties (legal) typically costs € 10	Yes

	SIM locking				SIM unlocking fee		
	Regulation on SIM locking	Maximum period to lock handset under the law	MNO practice (in months)	Operators automatically have to send unlocking codes after the SIM lock period	Maximum fee to unlock handset	Fee MNOs apply in practice	Unlocking fee imposed on top of early contract termination fee
PL	No	NA	T-Mobile Polska, P4, Polkomtel – no simlock	NA	NA	Orange Polska – PLN 77 (€ 18,39) for majority of offers (free for phones ported to Orange) T-Mobile Polska – no sim-lock Polkomtel – no sim-lock	Yes
PT	Yes	Law does not limit the period to unlock the handset	24 months	No.	Repayment schedule : 100% of handset retail price in the first six months of loyalty period, 80% after 6 months, 50% in final year	NA	Yes, normally, the remaining monthly subscription fees until the end of the loyalty period.
RO	No, but there is a voluntary code of conduct that all mobile operators have agreed upon in 2009	NA	12 or 24 months	NA	NA	During the agreed initial commitment period: Vodafone: € 50,43 Orange: € 92 After the agreed initial commitment period: Vodafone: € 10 Orange: € 11	Yes

	SIM locking				SIM unlocking fee		
	Regulation on SIM locking	Maximum period to lock handset under the law	MNO practice (in months)	Operators automatically have to send unlocking codes after the SIM lock period	Maximum fee to unlock handset	Fee MNOs apply in practice	Unlocking fee imposed on top of early contract termination fee
SE	Yes, applies to post paid subscribers only	Yes, same as initial commitment period	24 months, same as the agreed initial commitment period. However some MNOs have stopped locking	Yes, from May 1, 2014, operators are required to inform the subscribers of their right to unlock handsets upon expiry of the initial commitment period that may not exceed 24 months	No	Most MNOs do not unlock handsets before expiry of the first 12 months of the initial commitment period. The usual fee is SEK 350 (€ 37,63) (e.g. Tre, Telenor)	Yes
SI	No	NA	In practice most handsets are no longer simlocked in Slovenia	NA	NA	MNOs generally unlock handsets for free	Yes
SK	No	NA	No SIM locking	NA	Unregulated	No	No
UK	No	NA	Varies considerably depending upon network policy, handset and individual customer profile	NA	NA	Standard fees vary from free (O2, H3G), to € 12 (EE) and € 21 for Vodafone	Yes

Source: WIK Consult/Cullen International.

2.5.3.7 Number portability

Article 30(1)-(4) USD deals with number portability and stipulates that numbers should be ported in the shortest time possible. Number activation for subscribers who have concluded an agreement to port a number should take place within one working day and with a maximum service interruption of one working day.

The implementation of the provisions in relation to fixed number portability is shown in Table 33:

- All EU Member States have implemented regulations regarding fixed number portability except for Austria, where fixed number porting is incorporated in the reference offers of incumbent A1 Telekom.
- The number porting process can be thought of as being comprised of two distinct phases: an *overall process* (porting from donor/leaving operator (DO) to receiving/gaining operator (RO)), and an *activation process* (on the receiving/gaining network). In Table 33 and Table 34, the total porting time is the sum of the *overall time* and the *activation time*.
 - The activation of the ported number usually takes one working day (WD), but there are two Member States where this takes longer (Estonia (four days) and Spain (six days) when broadband is involved in a bundle).
 - The overall process shows a wider variation. Only six Member States have a one WD limit. There can be exceptions when new infrastructure is required or when other technical operations are required. The average is around 3-5 WD, but businesses may take longer (up to 11 WD). The longest observed timeframes for the overall process are 16 WD for Latvia, 22 for Malta, and 39 for Estonia.
- In 18 Member States, end-users are in practice not charged for fixed number porting, although charging is allowed in some instances. In eight Member States, charging of end-users is allowed, with charges ranging from € 5-10.

Table 33: Number portability – fixed networks (Article 30(1)-(4) USD) as of February 2016

	Number portability activation process		Number portability overall process		End-user costs
	Regulation adopted	Maximum timeframe	Regulation adopted	Maximum timeframe	
AT	Only mobile Number Portability (NP) regulated. Fixed number portability was established by TTK in dispute settlement and afterwards incorporated in Reference interconnection offers (RIO) A1 Telekom (A1TA)	Not specified in the Reference interconnection Offer (RIO) of provider A1TA	See first column	Not specified in the RIO of provider A1TA	No, there is a fee of € 21,79 to be paid by the recipient operator to the donor operator
BE	Yes	1 WD	Yes	Simple porting request (customers): 95% in 1 Working Days (WD), but max 2 WD. For complex porting (business) 95% in 2 WD, but max 3 WD. In all cases + 1 WD for activation on new network	No, Reference Offer (RO) can ask a compensation of a maximum amount of 10 euros to the end-user
BG	Yes	1 WD	Yes	Up to 3 days for a single number and 5 days for block of numbers	No costs in practice, nevertheless, operators may define a price for fixed NP
CY	Regulation adopted 2004, public consultation carried out in 2013, procedure on going	6 days in the NP regulation, 4 days in practice	Regulation adopted 2004, public consultation carried out in 2013, procedure on going – no differentiation between fixed and mobile	14 days in practice, however the telecoms law defines 1 WD	No. The regulator cannot set a specific retail price/cost, only define the cost between providers for the porting process. In practice providers do not charge end-users
CZ	Yes	1 WD	Yes	4 WD	Unregulated, in practice no charge
DE	Yes	1 WD	Yes	10 WD (recommended but not fixed in Law). DT applies 8 WD in its Terms and Conditions (T&C)	Unregulated, however a court decision recommends a max of € 30. Provider DT charges € 6,92 per request for single porting request and € 8,10 for main ISDN number and € 0,42 for subsequent numbers

	Number portability activation process		Number portability overall process		End-user costs
	Regulation adopted	Maximum timeframe	Regulation adopted	Maximum timeframe	
DK	Yes	1 WD	Yes	1 WD	No, Donating Operator (DO) is not allowed to charge the end-user any fees in connection with number portability
EE	Yes	4 WD:	Yes	39 WD	None, NP costs are carried by RO
ES	Yes	1 WD, but 6 WD if it also involves broadband connection	Yes	Same as in previous column, because maximum time frame is defined from the end-user's porting request (except if technical operations are required in the access line)	Yes, operators allowed to charge end-users, but in practice not charged
FI	Yes	60 min	Yes	Porting time cannot exceed 5 WD in addition to the standard service delivery time of the operator (which is stipulated in the contract), unless otherwise agreed between the subscriber and the operator	No
FR	Yes	1 WD	Yes	3 WD for residential users, 7 WD for business users	Unregulated
GR	Yes	1 WD for porting and activation, when no local loop is required.	Yes	2 WD	No, DO cannot charge the subscriber. Cost between operators is defined by NRA
HR	Yes	3 hours	Yes	5 WD	No
HU	Yes	1 WD	Yes	3 WD	No, part of the cost could be charged to the end-user in accordance with the Electronic Communication Act C/2003, but this is not used in practice

	Number portability activation process		Number portability overall process		End-user costs
	Regulation adopted	Maximum timeframe	Regulation adopted	Maximum timeframe	
IE	Yes	1 WD	No	Not applicable	No
IT	Yes	1 WD	Yes	9 WD	No
LT	Yes	1 WD	Yes	1 WD	No
LU	Yes	Not defined	Yes	If no change to infrastructure required: 1 WD. If change required asap. However parties are free to decide on a longer porting timeframe (businesses)	Yes, porting costs must be non-discriminatory and cost-oriented. Can only be charged to end-user by RO
LV	Yes	1 WD	Yes	16 WD	Yes, DO is not allowed to charge the end-user, whereas RO may set a one-off cost based charge or a monthly charge to the end-user for number portability
MT	Yes	1 WD	Yes	22 WD	Yes, RO may charge subscriber provided that this does not act as a disincentive to portability. In practice, not charged
NL	Yes	1 WD	Yes	10 WD	Yes, max € 10
PL	Yes	1 WD	Yes	7 WD	No
PT	Yes	1 WD	Yes (same referred)	In general 1 WD, with defined exceptions (longer configuration time required, door to door sales, new physical infrastructure)	Typically, end-users are not charged.
RO	Yes	1 WD	Yes	3 WD	Yes, but not regulated, charges should be clear
SE	Yes	1 WD	Yes	4 WD residential users, 11 WD business users	No

	Number portability activation process		Number portability overall process		End-user costs
	Regulation adopted	Maximum timeframe	Regulation adopted	Maximum timeframe	
SI	Yes	1 WD for porting and activation	Yes	1 WD for porting and activation	Yes, max € 5
SK	Yes	1WD	Yes	4 WD	Self-regulation. Operators agreed to charge € 0 for number portability since January 2014
UK	Yes	1 WD for porting and activation	Yes	1 WD for porting and activation	Unregulated, but any charges to subscribers must be on reasonable terms

Source: WIK Consult/Cullen International.

Table 34 shows the implementation of mobile number portability. Results are as follows:

- All Member States have implemented rules regarding mobile number portability.
- All Member States have implemented regulation on the activation phase. All have implemented regulation on the overall number portability phase except for Austria and Ireland.
- In general, the activation of a mobile number on the receiving network is one working day, with the exception of Cyprus (9 days) and Estonia (4 days) and for Poland in certain scenarios (for instance, when the porting is requested by letter instead of via the shop, the activation time amounts to 3 working days).
- The overall process shows a wide variation, as with fixed number portability. The average duration seems to be slightly longer than for fixed number porting, i.e. between 3-10 working days. There are eight countries that have implemented mobile number porting in just one working day. At the other end of the spectrum is Estonia, which allows 25 working days for mobile number portability when business users are concerned.
- 16 Member States have implemented regulations to ensure that the end-user cannot be charged for mobile number porting; however, other Member States permit modest compensation for number porting, generally in the range of roughly € 10. In ten Member States, there are charges set by the NRA varying from € 5 (Slovenia) to € 10 (Austria, Netherlands) to € 30 (Denmark).

Table 34: Number portability – mobile networks (Article 30(1)-(4) USD) as of February 2016

	Number portability activation process		Number portability overall process		End-users cost for MNP?
	Regulation adopted	Maximum timeframe	Regulation adopted	Maximum timeframe	
AT	Yes	Service interruption shall be as short as possible, and in no case longer than 1 WD	No	Not regulated	Yes, max. € 19 until Feb. 29, 2016, thereafter max € 10
BE	Yes, Royal Decree on number portability	1 WD	Yes, Royal Decree on number portability (NP)	For a simple porting (consumers): 1 WD maximum. For complex porting (businesses): 3 WD including activation	No, however, the Reference Offer (RO) can ask a compensation of a maximum amount of € 10 to the end-user
BG	Yes	1 WD	Yes	2 WD	No costs for Mobile NP, nevertheless the Mobile Network Operators (MNOs) may define such a price
CY	Yes	9 days in the NP regulation, 7 days in practice and 1 day in the Law.	Yes	14 days.	The regulator cannot set a specific retail price/cost, only define the cost between providers for the porting process. In practice, providers do not charge end-users
CZ	Yes	1WD	Yes	4 WD	Unregulated, in practice no charge
DE	Yes	1 WD	Yes	7 WD, but this is not regulated. DT imposes 8 working days in its T&C	Yes, max € 29,95 (decision of BNetzA in 2004).
DK	Yes	1 WD	Yes	1 WD	No, RO can ask the end-user for a compensation of a maximum amount of € 10
EE	Yes	4 WD	Yes	25 WD	No, NP carrier by RO

	Number portability activation process		Number portability overall process		End-users cost for MNP?
	Regulation adopted	Maximum timeframe	Regulation adopted	Maximum timeframe	
ES	Yes	1 WD	Yes	1 WD	Yes, MNP operator allowed to charge does not discourage switching. In practice not charged
FI	Yes	10 min	Yes	NP must be implemented <i>"without delay"</i> , FICORA specifies this means porting time cannot exceed 5 WD in addition to the standard service delivery time	No
FR	Yes	1 WD	Yes	3 WD	No
GR	Yes	1 WD for porting and activation	Yes	2 WD	No, the regulator only defined the cost between providers for the porting process. In practice providers do not charge end-users
HR	Yes	3 hours	Yes	3 WD	No
HU	Yes	1 WD	Yes	3 WD	No, part of the cost could be charged to the end-user but this is not used in practice
IE	Yes	1 WD	No	Not regulated	No
IT	Yes	1 WD for porting and subsequent activation	Yes	1 WD, For porting and subsequent activation	No
LT	Yes	1 WD	Yes	1 WD	No
LU	Yes,	1 WD	Yes	Not specified	Yes, possibly by the RO, no amount set. Costs must be non-discriminatory, efficient and reasonable

	Number portability activation process		Number portability overall process		End-users cost for MNP?
	Regulation adopted	Maximum timeframe	Regulation adopted	Maximum timeframe	
LV	Yes	1 WD	Yes	16 WD	Yes, RO may set a one-off cost based charge or a monthly charge to the end-user for number portability
MT	Yes	1 WD	Yes	1 WD	Yes, RO may charge subscriber. In practice not done
NL	Yes	1 WD	Yes	10 WD	Yes, max € 10
PL	Yes	6 hours (request via shop) to 3 WD (if request done by mail, letter)	Yes	1 WD	No
PT	Yes	1 WD	Yes	1 WD	No, end-users are not charged.
RO	Yes	1 WD	Yes	3 WD	Yes, but not regulated.
SE	Yes	1 WD	Yes	4 WD (activation and porting)	No
SI	Yes	1 WD	Yes	1 WD	Yes, max € 5
SK	Yes	1WD	Yes	4 WD	Self-regulation. Operators agreed to charge €0 for number portability since January 2014
UK	Yes	1 WD	Yes	1 WD	Unregulated, but charges must be reasonable

Source: WIK Consult/Cullen International.

Further rules on switching processes, service disruption and compensation are contained in Table 35:

- The majority of the Member States (23) follow a receiving operator (RO) led porting process for fixed and mobile voice. There are only 2 Member States which use a donor operator (DO) led number porting process (Latvia for fixed and mobile voice, and UK for mobile voice, however there is a proposal to change to RO in the UK).
- The majority of the Member States (20) imposed rules to minimise service interruption. For fixed and mobile number porting 3 hours seem to be a standard, but variation is observed (15 minutes to 2 calendar days).
- A bit more than half of the Member States (15) implemented compensation and refund arrangements in case of porting delay or longer than expected service interruptions. Half of this group set specific penalties for delay ranging from € 1-3 per day to lump sum amounts of € 60. Denmark and Slovakia both set around € 60 for abusive porting.
- In almost all Member States the rules on switching apply to all end-users, except in Croatia (HR) and Portugal (PT), where there are exceptions for business users (either when public procurement or when businesses have entered into a contract with different compensation schemes).

Table 35: Rules on switching process and service disruption and compensation as of February 2016

	Service category	Led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption, including any provisions on maximum allowed interruption of service	Compensation and refund arrangement in case of delay or failure to minimise service disruption	Same rules apply to consumers and other end-users?
AT	Fixed voice	RO	No rule in primary or secondary legislation	Not regulated	Yes
	Fixed broadband	Not regulated	Not regulated	Not regulated	NA
	Mobile	RO	Interruption of service must be "as short as possible" and "in no case longer than one working day"	Not regulated	Yes
BE	Fixed voice	RO	Not regulated	Not regulated	Yes
	Fixed broadband	Not regulated	Not regulated	Not regulated	NA
	Mobile	RO	Not regulated	Not regulated	Yes
BG	No regulation	Not regulated	Not regulated	Not regulated	NA
CY	Fixed voice	RO	Downtime should not exceed 60 min. If for technical reasons portability is not possible then the service should be provided for up to 48hours by the DO	Not regulated	Yes – regulation refers to consumer/end-user
	Fixed broadband	RO	Not regulated	Not regulated	NA
	Mobile	RO	Not regulated	Not regulated	NA
CZ	Fixed and mobile number portability	RO	6 hours	NRA can impose a penalty up to CZK 10m if service provider breaches number portability rules but no specific regulation to minimise service. Services providers should determine compensation in terms and conditions	Yes
	Fixed broadband	RO	Unregulated but generally accepted that minor disruption overnight is possible.	Not regulated	Yes
DE	Fixed voice	RO	Yes, maximum allowed interruption of the service of 1 calendar day. In case of failure, DO has to keep providing the service until the switching process has been concluded.	Yes, 50% of the monthly subscription fee agreed in the original contract with the DO, calculated on a daily basis.	Yes

	Service category	Led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption, including any provisions on maximum allowed interruption of service	Compensation and refund arrangement in case of delay or failure to minimise service disruption	Same rules apply to consumers and other end-users?
	Fixed broadband	Not regulated	Not regulated	Not regulated	NA
	Mobile	RO	Yes, maximum allowed interruption of the service of 1 calendar day. In case of failure, DO has to keep providing the service, until the switching process has been concluded.	Yes, 50% of the monthly subscription fee agreed in the original contract with the DO, calculated on a daily basis.	Yes
DK	Fixed / Mobile voice	RO	Yes, providers of electronic communications networks or services shall pay end-users a reasonable compensation in case of delayed porting and in case of misuse of porting made by the provider or on the provider's behalf.	Following rules on compensation to end-users are set: - Delayed porting: DKK 50 + DKK 5 for each day of delay; - Service disruption for over 24 hours: DKK 50 + DKK 50 for each full day of service disruption- Unauthorised porting: DKK 500	Yes
	Fixed broadband	RO	Not regulated	Not regulated	NA
EE	Fixed voice	No such requirements, Requirements to both RO and DO	Service disruption: maximum of 15 min.	Penalty for breach of number portability requirements: € 3.200 max	All end-users
	Fixed broadband	Not regulated	Not regulated	Not regulated	NA
	Mobile	No such requirements, requirements to both RO and DO	Service disruption: 15 min. max	Penalty for breach of number portability requirements: € 3.200 max	All end-users
ES	Fixed voice	RO	Yes	Not regulated	Yes
	Fixed broadband		Yes, set switching window (up to 3 hours for FNP and 4 hours from 2 to 6 am for MNP). NRA set obligation to guarantee service continuity and QoS while porting (except in window)	Yes, automatic compensation in case of temporary service interruption	
	Mobile		Yes	Not regulated	

	Service category	Led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption, including any provisions on maximum allowed interruption of service	Compensation and refund arrangement in case of delay or failure to minimise service disruption	Same rules apply to consumers and other end-users?
FI	Fixed voice	RO	Yes, max allowed interruption 60 minutes	Yes, but not specific to switching. General compensation rule: Service delay/interruption: standard compensation of min. € 20 for each full or partial week of service interruption/delay but no more than € 160	Yes, for switching procedure
	Fixed broadband	RO	Yes, FICORA made recommendation regarding migration procedure (aims to minimise service disruptions)	Same as above	Yes, FICORA recommendation applies to all users.
	Mobile	RO	Yes, maximum allowed interruption: 10 minutes	Same as above	Same as above
FR	Fixed voice	RO	Yes, maximum allowed interruption of the service: 1 calendar day	Yes	Yes
	Fixed broadband	NA	Not regulated	Not regulated	NA
	Mobile	RO	Yes, maximum allowed interruption of the service: 4 hours	Yes	Yes
GR	Fixed voice	RO (number portability & local loop)	Yes - number portability	Yes for number portability. Compensation relates to the monthly fee and the number of days without service.	The term subscriber is used, which is defined as equivalent to that of the end-user.
	Fixed broadband	RO (number portability & local loop)	Yes - number portability		
	Mobile	RO (number portability)	Yes - number portability		
HR	Fixed voice	RO	Maximum interruption of service three hours	€ 1,31 for each day of delay	Yes
	Fixed broadband	RO	No. Normally, interruption of service should not last more than one day.	€ 31 per day until the date of implementation of the services, or the date of termination of the contract	Yes, except agreements concluded subject to public procurement procedure
	Mobile	RO	Maximum interruption of service three hours.	€ 1,31 for each day of delay.	Yes

	Service category	Led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption, including any provisions on maximum allowed interruption of service	Compensation and refund arrangement in case of delay or failure to minimise service disruption	Same rules apply to consumers and other end-users?
HU	Fixed voice	RO	Yes, 4 hours switching	HUF 5000 per porting delay for each number	Yes
	Fixed broadband	RO (for DSL only)	Not regulated	Not regulated	Yes
	Mobile	RO	Yes, 4 hours switching	HUF 5000 per porting delay for each number	Yes
IE	Fixed/Mobile /broadband	RO, (by commercial practice – not regulated)	Not regulated, (except for porting)	Not regulated (except for porting)	Yes
IT	Fixed voice	RO	Yes, the regulated migration procedures aim to minimise risks for service disruptions by making the handover on a certain date, as requested by the RO	Compensation for delays and/or service interruptions in relation to switching procedures and number portability (ranging from € 1,50 to € 7,50/day).	Yes
	Fixed broadband	RO	Same as for fixed voice	Same as for fixed voice, but proposed higher (1/3) compensation for >30 Mbps broadband services.	Yes
	Mobile	RO	Yes, in case of delayed or failed MNP, the DO must maintain the service subject to same terms and conditions as before	Same as for fixed voice	Yes
LT	Fixed / mobile telephony	RO	Yes	Not regulated, general rules apply on penalties	Yes
	Fixed broadband	Not regulated	Not regulated	Not regulated	NA
LU	Fixed / mobile voice	RO	Yes, operators that originate phone calls must convey the calls towards ported number to the right destination. Service interruption as short as possible	Not regulated	Yes
	Fixed BB	RO	Not regulated	Not regulated	Unregulated

	Service category	Led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption, including any provisions on maximum allowed interruption of service	Compensation and refund arrangement in case of delay or failure to minimise service disruption	Same rules apply to consumers and other end-users?
LV	Fixed/Mobile voice	DO	Yes, DO is obliged to provide continuity of service until the moment the RO starts provision of services to the subscriber. Service interruption must not exceed 2 hours	Compensation must be regulated by the contract between the donor operator and subscriber	Yes
	Fixed broadband	Unregulated	Not regulated	Not regulated	Unregulated
MT	Fixed / Mobile voice	RO	Yes	Not regulated	Yes
NL	Fixed / mobile voice	RO	Yes, both operators should cooperate to ensure the porting of a number within ten working days or on the first day of the termination of the contract if the request has been done more than ten days in advance	Not regulated	Yes
	Fixed broadband	RO	Not regulated	Not regulated	NA
PL	Fixed and mobile voice	RO	Yes - Mobile number portability – service interruption shall last for max 3 hours (00.00 – 03.00) - Fixed number portability – service interruption shall last for max 24 hours - unless subscriber agrees with a longer interruption	Delay caused by DO: for each day of delay in NP the compensation equals 25% of average monthly payment calculated based on the last three invoices If RO ports number without consent of subscriber, he shall compensate him for every day since activation in RO's network with 50% of average monthly payment based on last three invoices	Yes
	Fixed broadband	Unregulated	Not regulated	Not regulated	NA

	Service category	Led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption, including any provisions on maximum allowed interruption of service	Compensation and refund arrangement in case of delay or failure to minimise service disruption	Same rules apply to consumers and other end-users?
PT	Fixed/ Mobile telephony, nomadic VoIP, toll-free call services, universal access services, flat-rate call service, premium-rate utility service, and personal number service	RO	Yes	Yes	Yes, except where business customers enter into a contract establishing different compensation scheme
RO	Fixed and mobile number portability (no specific provisions on switching providers)	RO	Not regulated	Not regulated	NA
	Fixed broadband	NA	Not regulated	Not regulated	NA
SE	Fixed voice	RO	Not regulated	Not regulated	Yes
	Fixed broadband	RO			
	Mobile	RO			
SI	Fixed / mobile voice	RO	Yes, interruptions as short as possible. Service deactivation may only start from midnight to 4 in the morning. All services must be running normally by 7 in the morning	Not regulated	Yes
	Fixed broadband	RO	Not regulated	Not regulated	Yes
SK	Fixed and mobile number portability	RO	Not regulated	Yes, delayed portability (€ 12 - € 60) unauthorised portability (€ 20-€ 60). Subscriber has 30 days to request compensation	Yes

	Service category	Led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption, including any provisions on maximum allowed interruption of service	Compensation and refund arrangement in case of delay or failure to minimise service disruption	Same rules apply to consumers and other end-users?
UK	Fixed voice / broadband	RO, or customer led if the change is from or to a cable operator without number portability (cease and re-provide process)	Not regulated, for broadband general condition to migrate within reasonable period with minimal loss of service	Not regulated	Yes
	Mobile	DO, Proposed: RO or automated DO process (where the customer request a code to the DO)	Not regulated	Not regulated	Yes

Source: WIK Consult/Cullen International.

2.5.3.8 Out-of-court dispute resolution

The implementation of Article 34 USD on out-of-court dispute resolution is illustrated in Table 36. Results are as follows:

- In the majority of the Member States (18), the NRA has organised the out-of-court dispute resolution for sector-specific complaints.
- In 7 of these Member States, the dispute resolution is done not only by the NRA but also by other organisations (mainly consumer organisations) or even by industry organisations.
- In the Member States where the NRA itself does not handle disputes (9), consumer organisations (4) or to a lesser degree the industry itself (3) handle the disputes (often enforced by regulation).
- Dispute handling is organised in most Member States (17) by one entity. This might be the NRA (11), or it might be a designated industry person (3), or an ombudsman. In the other nine Member States, dispute resolution is organised by two or even three entities (either the NRA, industry, a ministry or a consumer organisation). There is often a division of labour (e.g. mediation by the NRA and dispute resolution by a consumer organisation).
- Dispute resolution by the Ministry is not common. Only in Greece and Spain is the ministry involved in dispute resolution for electronic communication services. In general, an end-user can bring his or her complaint either to the NRA or to a consumer organisation and ultimately to court. In some Member States

(Germany, Finland and Latvia), there is an additional step, where the NRA or consumer organisation offers the option of mediation before raising the issue to a dispute/complaint.

- With regard to compensation mechanisms, in 11 Member States, the responsible entity can enforce compensation in out-of-court dispute resolution. In an additional 5 Member States, the entity can make a non-binding suggestion of compensation.
- The average resolution time for complaints/disputes between service providers and end-users is around 4 months. This is based on the 18 Member States where statistics or clear targets are available. Variation among the Member States is substantial, from 0,5 to 14 months.
- There is also great variation among the Member States as regards the number of complaints received. There are Member States that have registered only a few hundred complaints, while others have registered many more (Poland 5.223; UK 15.173; and Spain 34.327). However, the NRAs who receive the largest number of complaints do not have the longest resolution time – the UK and Poland have short resolution times (1.5 - 2 months) despite the high volumes, while Spain (which receives the greatest number of complaints) has set a target to resolve complaints within 6 months.

Table 36: Out-of-court dispute resolution (Article 34 USD) as of February 2016

	Dispute resolution organised by				Compensation mechanism foreseen	Number of complaints handled per year	Reported data on time to resolve disputes
	NRA	Ministry	Industry	Other			
AT	Yes, RTR acts on the basis of a dispute settlement provision in the Telecommunications Act	No	No	The Consumer Protection Association VKI, the workers' chamber (Arbeiterkammer) and several larger media also handle consumer complaints.	Suggested compensation; RTR cannot impose a binding decision. If parties do not both agree with RTR's proposal, the dispute has to be settled in court	5,470 in 2011, 4,370 in 2012, 2,859 in 2013, 3,879 in 2014	78% of cases settled in less than 6 months in 2014
BE	(Yes), service created within the BIPT (NRA) but it is independent from BIPT	No	No	No	No	20,450 complaints handled in 2014.	Not available
BG	Yes, Commission on Regulation of Communications (CRC)	No	No	No	No	Not available	Not available
CY	Yes. Claims submitted through OCECPR website.	No	No	No	Yes. OCECPR has the authority to take decisions on disputes and request compensations. If the provider does not abide the decision, OCECPR can impose fines.	140 in 2014, 111 in 2015	Not available
CZ	Yes, CTU (Czech Telecommunication office)	No	No	No	Case by case	Around 50,000 complaints initiated every year (mostly unpaid bills)	Not available

	Dispute resolution organised by				Compensation mechanism foreseen	Number of complaints handled per year	Reported data on time to resolve disputes
	NRA	Ministry	Industry	Other			
DE	Yes, BNetzA mediates in case of disputes between provider and end-users. Claims submitted via BNetzA website	No	No	No	Yes, as part of the conciliation procedure, BNetzA may propose that compensation be given	1,014 in 2014, 866 in 2013, 674 in 2012, 678 in 2011, 703 in 2010	Not available
DK	No	No	Yes, Telecommunications Complaint Board – private ADR, but approved by the Ministry under the Consumer Complaints Act	No	Yes, Complaint Board can take binding decisions, including on compensation	342 in 2014, 379 in 2013	37 days in 2014.
EE	No	No	No	Consumer Protection Board (ECPB) ENRA might support ECPB in such disputes	Yes, Complaint Board can take binding decisions, including on compensation	2,391 in 2014	Not available
ES	No	Yes, Secretary General for Telecommunications (SETSI) - Office for telecommunications users	No	Yes, Regional and local arbitration boards, provided the company has adhered to this system	No. Requests for compensation for damages are the competence of Spanish courts.	31,030 complaints received in 2015 (and 37,045 complaints solved). 34,327 complaints received in 2014 and 31,612 in 2013. (Office of Telecoms Users report)	Not available

	Dispute resolution organised by				Compensation mechanism foreseen	Number of complaints handled per year	Reported data on time to resolve disputes
	NRA	Ministry	Industry	Other			
FI	No, although FICORA supervises the compliance with the provisions of the Information Society Code	No	No	Consumer first step is to contact the Consumer Advisory Service for mediation. If unsuccessful, the dispute can be referred to the Consumer Disputes Board, which is an independent body.	Yes	5,350 in all sectors in 2013 (i.e. not limited to telecoms)	Not available
FR	No	No	Yes, every telecom operator has to set up an ombudsman	No	Suggested compensation. The mediator only adopts recommendations on compensation, not binding decisions.	2,868 in 2014 (down from 4,848 in 2012 and 3,053 in 2013)	56 days in 2012
GR	Yes, the EETT has a separate department dedicated to the handling of consumer complaints. EETT may impose the administrative sanctions	Yes	No	General secretariat for commerce and consumer protection Hellenic Consumer Ombudsman – independent authority that acts as court body dispute resolution and advisory body to the state.	Yes, as part of the dispute resolution mechanism. Specific compensations defined in more specific regulations, such as cases of delayed fault recovery, portability etc.	Hellenic Consumer Ombudsman: 1,697 in 2014. EETT: 10,720 in 2014.	Hellenic Consumer Ombudsman: 87 days (average for all complaints) in 2014. EETT: 15.2 days in 2014
HR	Yes, Hakom	No	No	No	Limited compensation; HAKOM has the power to oblige operators to return the amount charged or to terminate the contract. Other compensation can only be imposed by court.	4,843 in 2014, 4,135 in 2013, 2,339 in 2012, 1,786 in 2011	2-3 months in 2014

	Dispute resolution organised by				Compensation mechanism foreseen	Number of complaints handled per year	Reported data on time to resolve disputes
	NRA	Ministry	Industry	Other			
HU	Yes, NMHH handles end-user complaints in regard to QoS and pricing	No	No (but every medium and large enterprise has to employ a consumer protection representative)	National Consumer Protection Authority	No	2,673 in 2014, 3,379 in 2013	Not available
IE	Yes	No	No	No	No, compensation is at the discretion of the service provider	Not available, ComReg only provides information on the total of complaints and queries received (23,065 in 2015)	Not available
IT	Yes, if conciliation fails, the case can be brought to AGCOM. This must be done within 3 months from the conclusion of conciliation.	No	Yes, industry in cooperation with consumer associations	Chambers of commerce	Yes, in dispute resolution: In 2014, compensations amounted to about € 1m	86.67 conciliation requests; 5,198 dispute resolution requests in 2014	Not available
LT	Yes, RRT is in charge of dispute resolution between service providers and between end-users and service providers	No	No	No	Yes, RRT can take any binding decision could be taken, including on compensation (if the legal background exists)	In 2014, RRT received: 245 complaints, 166 dispute resolution requests from end-users and 3 disputes between operators	18.7 days as of 2014 for disputes between end-users and service providers
LU	Yes, ILR mediation service,	No	No	No	No	2014: 58 mediation requests	Not available
LV	Yes	No	No	Yes, there is an option to settle a dispute in the out-of-court manner by a mediator	No	1 (2014)	Not available

	Dispute resolution organised by				Compensation mechanism foreseen	Number of complaints handled per year	Reported data on time to resolve disputes
	NRA	Ministry	Industry	Other			
MT	Yes	No	No	Yes, Complaints and Conciliation Directorate within the Office for Consumer Affairs of the Malta Competition and Consumer Affairs Authority (MCCAA)	Yes, MCA: may require a service provider to give compensation to a customer if the quality of service levels agreed upon in the contract are not met.	MCA: 395 in 2014, MCCAA: no data available for complaints specific to electronic communications	55% in < 1 week, 18% in < 2 weeks, 18% in < 4 weeks, 9% in 4+ weeks in 2014
NL	No	No	No	Yes, Complaint boards. Each board consists of a lawyer and representatives of the Dutch consumer association and a trade association	Yes, Complaint boards can take binding decisions, including on compensation.	878 (2014) ECS: 339 complaints filed, 85 rulings, 132 settlements. PRS: 14 complaints, 2 rulings, 0 settlements.	2.9 months (average of all complaint boards, including settlements) in 2014
PL	Yes	No	Yes, Consumer organisations providing free legal advice	Yes, Arbitral Court of UKE decides property disputes, disputes on invoices and service provision	No, Damage claims shall be addressed to general courts	In 2015: 5,223 requests for UKE's intervention; out of those, 78.08% ended in favour of consumer. 2,406 mediation procedures; out of those, 61.35% ended in favour of consumer	2 weeks to 2 months in 2015
PT	No	No	No	Yes, private entities subject to Ministry supervision - the General Director for consumer, attached to the minister for Economy	No, however, dispute resolution centres may decide in favour of application of contract rules that foresee compensation.	Not available	Not available

	Dispute resolution organised by				Compensation mechanism foreseen	Number of complaints handled per year	Reported data on time to resolve disputes
	NRA	Ministry	Industry	Other			
RO	Yes	No	No	No	No, decisions have only the form of recommendations	1,684 in 2014	Not available
SE	No	No	Yes, the Swedish Telecom Advisors acts as a mediator in disputes between consumers and operators who are members of the association and co-finance its activities	Yes, National Board for Consumer Complaints (ARN) - handles consumer disputes in several industry sectors. For a dispute in the field of ECS, its value must be at least €53.75	Suggested compensation. ARN decisions are not binding recommendations, but in practice are followed by most operators, including on compensation	ARN: 1,971 in 2014; 2,043 in 2013; 2,132 in 2012. The Swedish Telecom Advisors: 8,492 in 2014; 8,108 in 2013; 7,912 in 2012; 7,200 in 2011	Not available
SI	Yes, AKOS tries to resolve disputes first with a mediation procedure. If compromise cannot be reached through mediation (or if one of the parties demands it) the dispute is resolved in a formal procedure	No	No	No	No, requests for compensation for damages are the competence of Slovenian courts. AKOS can only award subscription payments cancellations.	814 complaints received in 2015	101 days in 2015
SK	Yes Regulatory Authority for Electronic Communications and Postal Services	No	No	No	Yes	Not available	Not available

	Dispute resolution organised by				Compensation mechanism foreseen	Number of complaints handled per year	Reported data on time to resolve disputes
	NRA	Ministry	Industry	Other			
UK	No	No	No	Yes, all communications providers are required to sign up to one of two approved ADR schemes (Ombudsman Services or CISAS). ADR can be used when a complaint has not been resolved after 8 weeks or is otherwise deadlocked.	Yes, consumers can be awarded up to £ 10.000 (€ 12.345) compensation for financial loss and inconvenience caused	20,951, Ombudsman Services: 15,173 complaints handled in 2014/15, CISAS: 5,778 complaints handled in 2014	42 days in 2015, Ombudsman Services: 97% resolved within 6 weeks, CISAS: 95% completed within 6 weeks

Source: WIK Consult/Cullen International.

2.5.4 Outcomes and problem areas

In the following section, we assess the implementation of the sector-specific end-user rules in the Member States under the current framework against the following three criteria:

- Whether consumers are provided with a complete contract;
- Whether consumers can make a well-informed choice; and
- Whether consumers can easily switch between providers.

For each of these criteria, we use indicators to measure the achieved outcome in the Member States. The outcome indicators are:

- **Completeness of the contract:** This is measured by the perception of consumers of whether the contract signed provided sufficient and clear information on contract duration and renewal, quality of service and termination (including termination charges).
- **Ability to make a well-informed choice:** This is measured by the perception of consumers of whether they can easily compare offers, both in terms of tariffs and quality of service.
- **Ease of switching:** This is measured by the actual extent of switching between providers in the past.

Each criterion – completeness of the contract, ability to make a well-informed choice, and ease of switching – is related to relevant end-user rules imposed in Member States using colour-coded tables. We then assess whether differences between Member States in outcomes for the above criteria can be related to differences in the end-user provisions imposed in Member States.

2.5.4.1 Completeness of contract

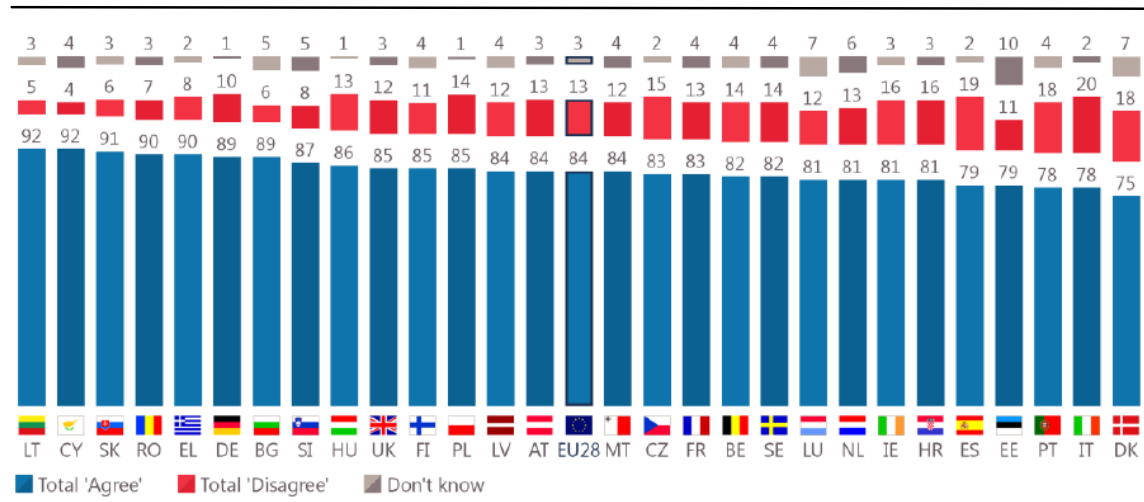
The Consumer Conditions Scoreboard for 2010-2013 did not contain telecom-specific complaints or questions on contract clarity. The 2016 Eurobarometer study²⁶⁷ contained for the first time questions regarding the clarity of the contract and hence is used for the outcome indicator. The questions asked about clarity relate to:

- (i) The contract duration and any renewal or roll-over conditions;
- (ii) The quality of the services subscribed to; and
- (iii) Termination, including early termination charges.

Figure 38 shows that, as of October 2015, 84% of those European households who had read their communications contract before signing it agreed that the contract had sufficient and clear information on *duration* and on *renewal or roll-over conditions*. While there was some variation across Member States, there was no Member State where less than 75% of households had a positive perception.

²⁶⁷ European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, May 2016, (<http://ec.europa.eu/COMMFrontOffice/PublicOpinion/index.cfm/ResultDoc/download/DocumentKy/72564>).

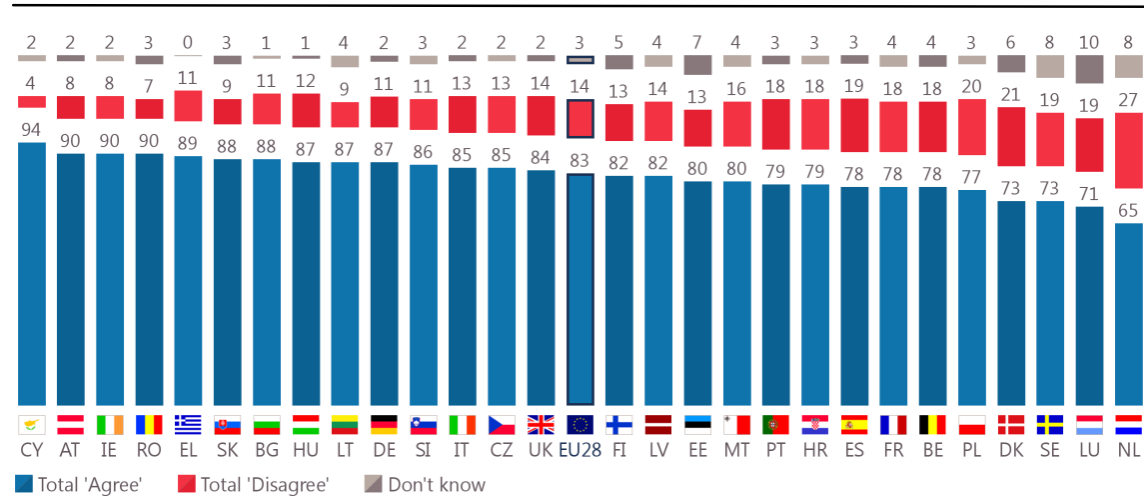
Figure 38: Percentage of households which agreed that the contract signed provided sufficient and clear information on the contract's duration and renewal or roll-over conditions, EU, October 2015



Source: European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, p. 113

The following Figure 39 shows that, as of October 2015, 83% of European households also agreed that the contract had sufficient and clear information on *the quality of services subscribed to*. Variation across Member States is somewhat greater, but the percentage of households agreeing that the contract had sufficient and clear information is at least 65% in all Member States.

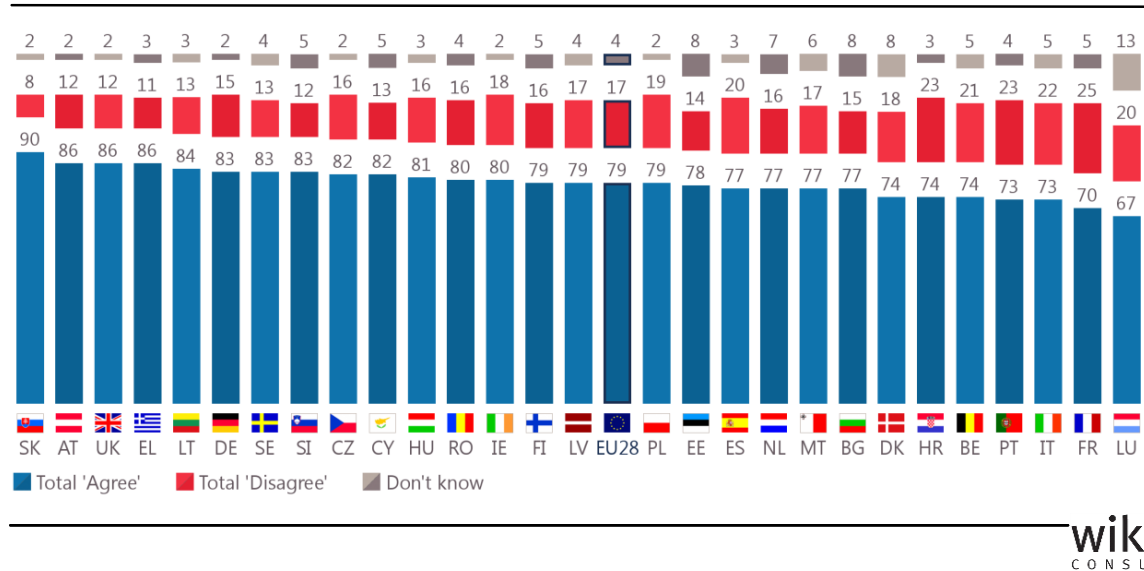
Figure 39: Percentage of households which agreed that the contract signed provided sufficient and clear information on the quality of services subscribed to, EU, October 2015



Source: European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, p. 113

Finally, Figure 40 indicates that, as of October 2015, 79% of European households agreed that the contract had sufficient and clear information on *termination, including possible early termination charges*. In no Member State does the percentage fall below 67%.

Figure 40: Percentage of households which agreed that the contract signed provided sufficient and clear information on termination (including possible early termination charges), EU, October 2015



Source: European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, p. 114

For further analysis, the previous three tables on the different contract aspects are aggregated in Table 37. This table ranks Member States by the arithmetic average of the perception of sufficient and clear contract information provided by the contract in the three areas (i) contract duration and renewal or roll-over conditions, (ii) quality of the services subscribed to; and (iii) termination, including early termination charges. The table shows that the average perception that contracts provide sufficient and clear information on relevant terms is nowhere below 73%, and is 90% in the highest ranked Member State (Slovakia).

The implementation of the relevant framework provisions (implementation of Article 20(1)-(2) USD) is very similar in all Member States (service providers must offer a contract with a minimum set of terms and conditions; they have to notify contract changes at least 1 month in advance, and subscribers can cancel the contract without penalty in this case). Only in Germany is there a longer notification period (42 days).

It is reasonable to assume on the basis of Table 37 that the high level of satisfaction with contract clarity is related to the requirements on contract information imposed by the Universal Service Directive; however, the table does not explain the variation in the outcome indicator (between 73% and 90%), inasmuch as the relevant USD provisions are implemented similarly by each of the Member States.

Table 37: Percentage of consumers agreeing that the contract signed provided sufficient and clear information on contract terms and imposition of relevant end-user provisions, EU, October 2015

	Percentage of households agreeing that the contract signed provided sufficient and clear information on ...				End-user provisions		
	Quality of services	Duration and renewal or roll-over conditions	Termination conditions (incl. early termination charges)	Average	Requirement to publish contract before conclusion	Notice period in case of contract changes (days)	Cancellation without penalty following contract changes
SK	88%	91%	90%	90%	Yes	30	Yes
CY	94%	92%	82%	89%	Yes	30	Yes
GR	89%	90%	86%	88%	Yes	30	Yes
LT	87%	92%	84%	88%	Yes	30	Yes
AT	90%	84%	86%	87%	Yes	30	Yes
RO	90%	90%	80%	87%	Yes	30	Yes
DE	87%	89%	83%	86%	Yes	42	Yes
SI	86%	87%	83%	85%	Yes	30	Yes
UK	84%	85%	86%	85%	Yes	30	Yes
BG	88%	89%	77%	85%	Yes	30	Yes
HU	87%	86%	81%	85%	Yes	30	Yes
IE	90%	81%	80%	84%	Yes	30	Yes
CZ	85%	83%	82%	83%	Yes	30	Yes
FI	82%	85%	79%	82%	Yes	30	Yes
LV	82%	84%	79%	82%	Yes	30	Yes
MT	80%	84%	77%	80%	Yes	30	Yes
PL	77%	85%	79%	80%	Yes	30	Yes
SE	73%	82%	83%	79%	Yes	30	Yes
EE	80%	79%	78%	79%	Yes	30	Yes
IT	85%	78%	73%	79%	Yes	30	Yes
BE	78%	82%	74%	78%	Yes	30	Yes
ES	78%	79%	77%	78%	Yes	30	Yes
HR	79%	81%	74%	78%	Yes	30	Yes
FR	78%	83%	70%	77%	Yes	30	Yes
PT	79%	78%	73%	77%	Yes	30	Yes
NL	65%	81%	77%	74%	Yes	30	Yes
DK	73%	75%	74%	74%	Yes	30	Yes
LU	71%	81%	67%	73%	Yes	30	Yes

Source: WIK Consult / Cullen International / European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438.

Stakeholder views

Based on the interviews, many stakeholders are of the opinion that the current sector-specific contract terms have served the end-user well. NRAs frequently spoke positively of the minimum harmonisation approach, which they regard as beneficial to the extent that minimum harmonisation allowed Member States to go beyond the minimum provisions of the Universal Service Directive.

However, the following problem areas related to the current contract provisions have also been mentioned:

- Service providers mentioned that the sector-specific provisions (in general) have led to fragmentation across the EU inasmuch as the current framework is based on minimum harmonisation. As previously noted, the minimum harmonisation allowed Member States to go beyond the minimum requirements. Fragmentation resulted in higher compliance costs, and slowed innovation for service providers operating in multiple EU countries.
- At national level, service providers noted the lack of a level playing field between electronic communications (ECS) providers and non-ECS OTT service providers. It was also mentioned by service providers and end-user associations that end-users are confronted with different contract rules when buying electronic communications services bundled with other services that do not fall within the sector framework.
- Some service providers have argued that current provisions impede innovation because service providers are reluctant to change contract terms since doing so would oblige them to offer their customers the right to withdraw from the contract without penalty. This also prevents providers from improving the contract terms.
- Industry associations representing business users have pointed to a number of specific problems encountered. Corporate end-users who switch service provider are often faced with overcharging for services that they continue to rely on during a transitory period because of an often complex migration process.
- Corporate end-users are also confronted with practices where the service provider counts the contract duration from the moment that the original contract is updated (e.g. whenever additional connectivity is ordered).

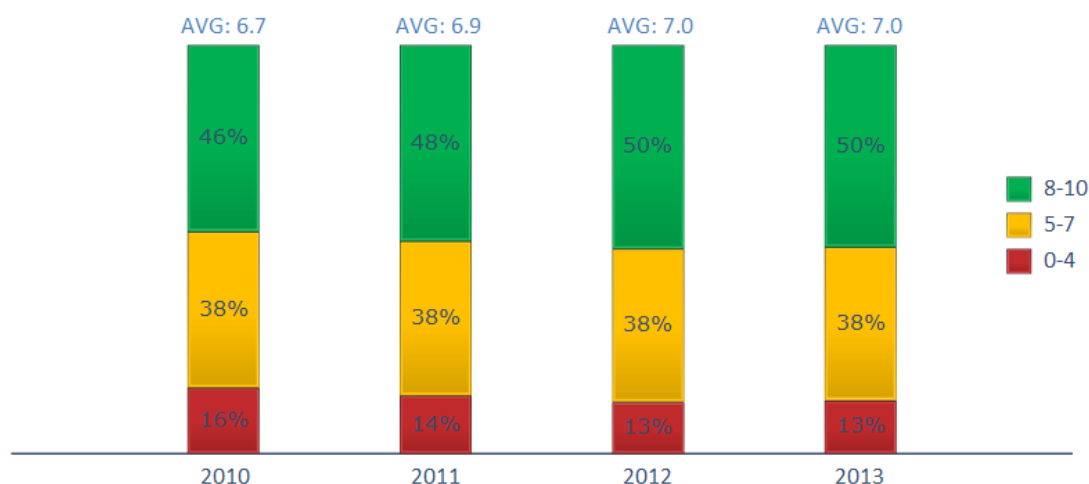
2.5.4.2 Ability to make a well-informed choice

For the period 2010-13, the EU Consumer Market Monitoring Survey asked respondents in the different EU Member States whether it was easy or not to compare the product/services sold by different suppliers. For fixed telephony services, the EU average of positive responses slightly increased from 46% in 2010 to around 50% in

2013 (Figure 41)²⁶⁸. Results for mobile and internet access services in 2013 were similar.

Figure 41: Percentage of households saying they can easily compare fixed telephony services sold by different providers, EU, 2010-13

On a scale from 0 to 10, how difficult or easy was it to compare the products/services sold by different suppliers?



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Source: European Commission (2013), EU Consumer Market Monitoring Survey 2010-2013, http://ec.europa.eu/consumers/consumer_evidence/consumer_scoreboards/market_monitoring/ds/dash1.swf

For the periods 2014 and 2015, we have used Eurobarometer surveys which ask the same question but with two differences, which might explain the difference in the outcomes compared to the Consumer Market Monitoring Survey:

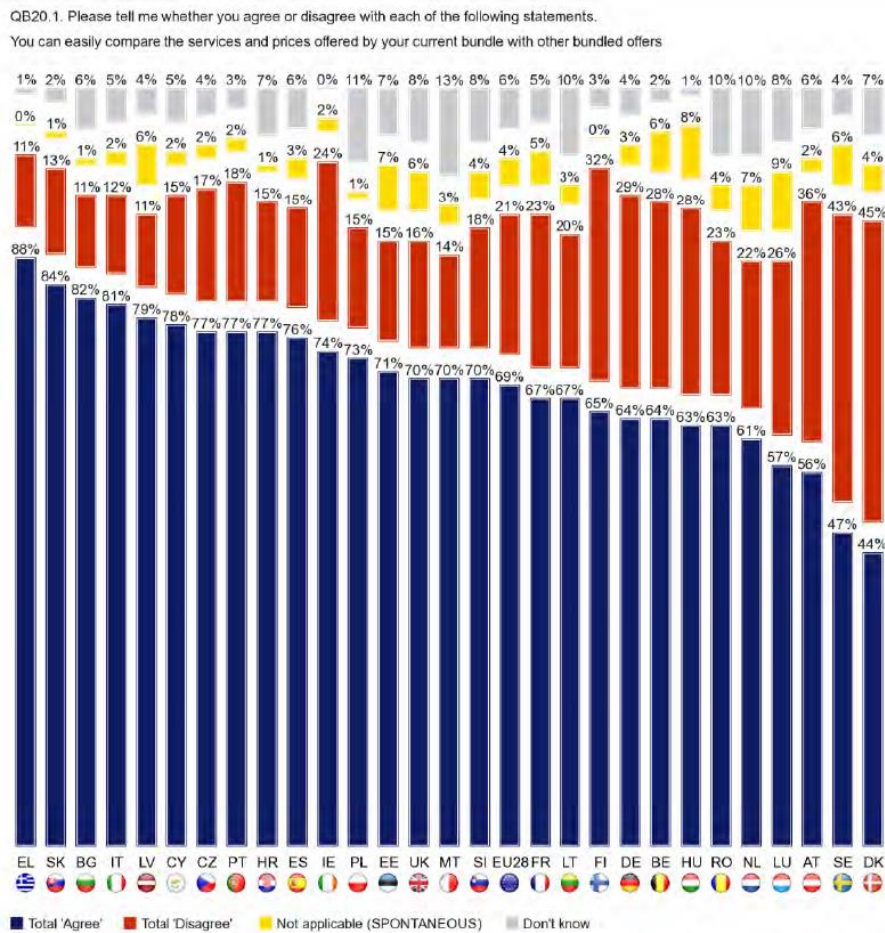
- Eurobarometer focuses on the ease of comparing bundles of services instead of the individual fixed telephony, mobile and internet services.
- The possible answer categories differ; where the Consumer Market Monitoring Survey used three categories of scores (0-4, 5-7, 8-10), the special Eurobarometer survey has four categories ('Agree', 'Disagree', 'Not applicable' and 'Don't know').

Results for January 2014 show that 69% of European households believe they could easily compare services and prices of their bundled offer with other bundled offers (Figure 42). Further outcomes were:

²⁶⁸ See also Appendix 5.1.

- Denmark (44%) and Sweden (47%) are the only Member States where fewer than half of the EU households said that they can easily compare the service and price of their current bundle with other bundles. In addition to those in Denmark and Sweden, respondents in Austria (36%) and Finland (32%) are likely to say they cannot easily compare services and prices of their current bundle with other bundle offers.
- In contrast, other Member States with high responses regarding bundle comparability above 80% are Greece (88%), Slovakia (84%), Bulgaria (82%), Italy (81%) and Finland (81%).

Figure 42: Percentage of households saying they can easily compare their services and prices of their current bundle with other bundled offers, EU, January 2014



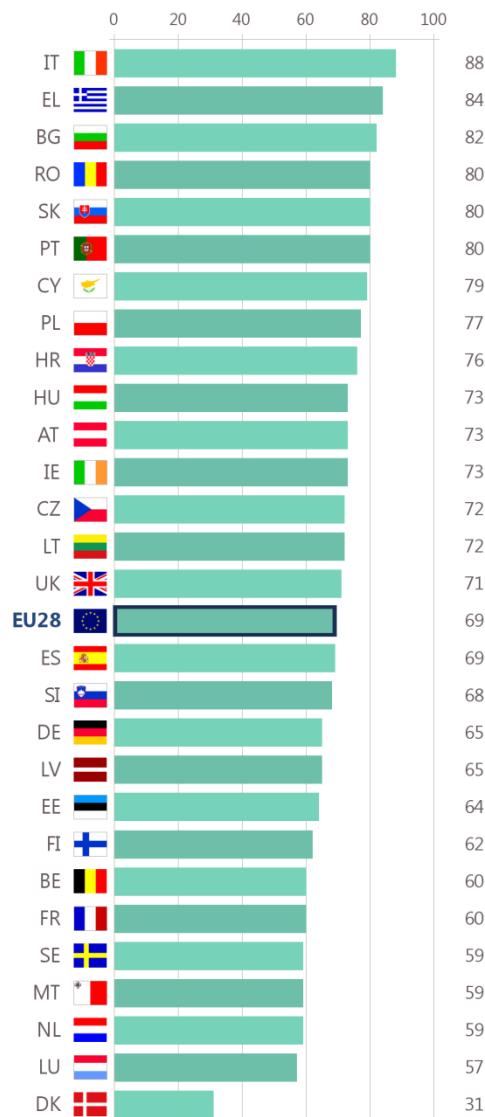
The Eurobarometer survey undertaken in October 2015 shows on average the same outcome (Figure 43): 69% of European households said that they can easily compare the services and prices offered by their current bundle with other offers.

In October 2015, Member States varied from 31% to 88%. At the lower end was Denmark with 31%. At the upper end were Italy, Greece and Romania, where more than 80% of households said they could easily compare their current bundle with other offers.

At Member State level, there are some interesting changes compared to the previous Eurobarometer survey: Romania scores fourth best in 2015 with 80%, while having previously been below the average in 2014 (63%). Denmark remains at the bottom with an even lower score in 2015 (31%) than in 2014 (44%).²⁶⁹ Sweden, which was second worst in 2014 with 47%, improved to 59% in 2015.

269 In Denmark, only about 20% of the population is subscribing to bundles and, in 2015, there was even a decrease of bundling versus 2014. Since January 2016, it became possible for Danish consumers to buy stand-alone broadband-only subscriptions from cable TV operators, which doesn't require users to subscribe to any specific TV content package. In addition, it is possible to have a very flexible arrangement subscribing to a specific channel which can be terminated at any time. ([http://www.ens.dk/sites/ens.dk/files/dokumenter/publikationer/downloads/telestatistik - foerste halvaar 2015 0.pdf](http://www.ens.dk/sites/ens.dk/files/dokumenter/publikationer/downloads/telestatistik_-_foerste_halvaar_2015_0.pdf))

Figure 43: Percentage of households saying they can easily compare their current bundle with other offers, EU, October 2015



Source: European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, p. 84,
<http://www.apdsi.pt/uploads/news/id1002/Eurobar%C3%B3metro%20438.pdf> .

Table 38 ranks Member States by the outcome indicator (taken from Figure 43 above) and shows how each Member State has imposed sector-specific end-user provisions which can facilitate comparability between suppliers including:

- (i) Whether service providers are required to provide contract information before conclusion of contract;
- (ii) Whether service providers are required to facilitate transparency and comparability on the basis of specific rules;
- (iii) The existence of quality of service comparison tools provided by the NRA;
- (iv) The existence of quality of service comparison tools provided by a third party;
- (v) The existence of tariff comparison tools provided by the NRA,;
- (vi) The existence of tariff comparison tools provided by a third party;
- (vii) Whether service providers are required to publish service quality indicators; and
- (viii) Whether there are minimum QoS targets set by the NRA.

Table 38: Ease of comparing bundles and imposition of relevant end-user provisions, EU

	Ease of comparability (% of respondents agreeing)	Requirement to provide information to end-users before conclusion of contract	Further requirements to facilitate transparency and comparability	Service comparison facilities - by NRA	Service comparison facilities - by third party	Tariff comparison tools - by NRA	Tariff comparison tools - by third party	Obligation to publish service quality indicators?	Minimum QoS targets
IT	88%	Yes	Yes	No	No	No	Yes	Yes	Yes
GR	84%	Yes	Yes	Yes	No	Yes	NA	Yes	No
BG	82%	Yes	Yes	No	No	No	No	No	Yes
PT	80%	Yes	Yes	Yes	Yes	Yes	NA	No	No
RO	80%	Yes	No	Yes	No	Yes	No	Yes	No
SK	80%	Yes	No	No	Yes	Yes	Yes	Yes	No
CY	79%	Yes	No	Yes	No	Yes	No	Yes	Yes
PL	77%	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HR	76%	Yes	Yes	Yes	Yes	Yes	No	Yes	No
AT	73%	Yes	Yes	Yes	No	No	No	Yes	No
HU	73%	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
IE	73%	No	Yes	No	No	Yes	No	Yes	No
CZ	72%	Yes	No	Yes	Yes	Yes	Yes	No	No
LT	72%	Yes	No	Yes	Yes	Yes	No	No	No
UK	71%	Yes	Yes	Yes	Yes	No	Yes	No	No
ES	69%	Yes	No	Yes	Yes	No	Yes	Yes	No
SI	68%	Yes	No	Yes	No	Yes	No	No	No

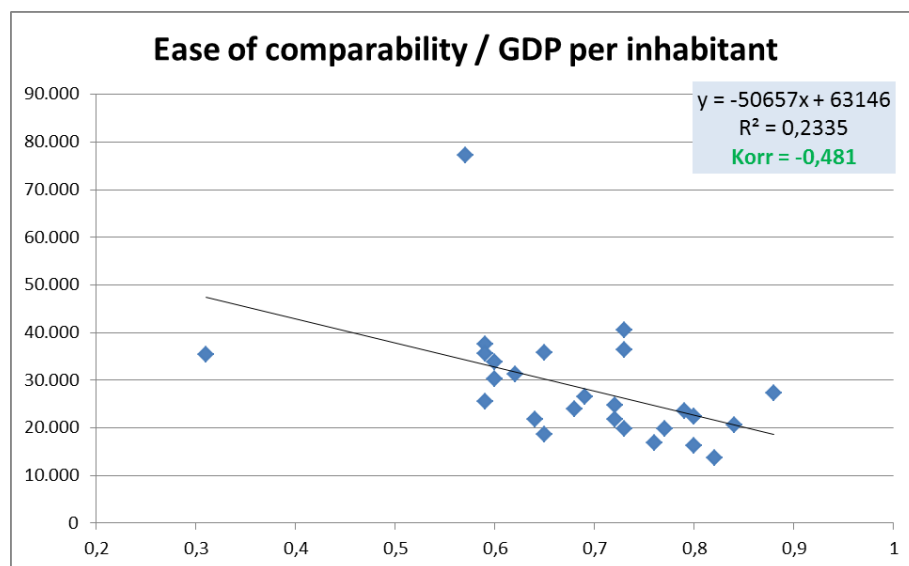
	Ease of comparability (% of respondents agreeing)	Requirement to provide information to end-users before conclusion of contract	Further requirements to facilitate transparency and comparability	Service comparison facilities - by NRA	Service comparison facilities - by third party	Tariff comparison tools - by NRA	Tariff comparison tools - by third party	Obligation to publish service quality indicators?	Minimum QoS targets
DE	65%	Yes	No	Yes	No	No	Yes	No	No
LV	65%	Yes	No	Yes	No	No	Yes	Yes	Yes
EE	64%	Yes	Yes	Yes	No	Yes	No	No	No
FI	62%	Yes	Yes	No	No	Yes	Yes	No	Yes
BE	60%	Yes	Yes	Yes	No	Yes	Yes	Yes	No
FR	60%	No	Yes	Yes	No	No	Yes	Yes	Yes
MT	59%	Yes	No	No	No	Yes	No	No	No
NL	59%	Yes	Yes	No	Yes	No	Yes	Yes	No
SE	59%	Yes	No	No	Yes	No	Yes	No	No
LU	57%	Yes	Yes	Yes	No	Yes	No	No	No
DK	31%	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Source: WIK Consult /Cullen International / European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438.

Table 38 shows that there are few clear linkages between the detailed measures imposed to implement the relevant USD provisions and the ease of comparing bundles. Member States have imposed measures to facilitate transparency in varying combinations and degrees, but the effects of these measures on the ease of comparing offers cannot readily be disentangled. It can however be noted from the table that the obligation to publish QoS indicators seems to be implemented more often in Member States where comparability is rated higher (upper part table) compared to Member States where comparability is rated lower (lower part of the table). To a lesser degree, the same can be said for tariff comparison tools provided by the NRA.

In order to look for other explanations, we checked whether there is a linkage between the ease of comparability and the general economic situation (GDP per inhabitant). In fact, there is a weak correlation between both parameters as shown in Figure 44. A possible explanation for this could be that the bundles include more services and/or paid features in Member States with higher GDP per inhabitant, which might complicate comparison of bundles.

Figure 44: Linkage between ease of comparability and GDP per inhabitant, EU



Source: WIK Consult.

In contrast, we could not find a linkage between ease of comparability and the extent of competition in broadband as indicated by the Hirschmann-Herfindahl index (HHI).²⁷⁰

²⁷⁰ The correlation coefficient between ease of comparability and broadband HHI is 0,065.

Stakeholders views

From the stakeholder's interviews, the most frequent and noteworthy comments regarding transparency are listed below:

- Operators noted the need for a balance between transparency and avoiding an information overload on end-users. The amount of information that providers are currently obliged to provide is significant, not only because of the sector-specific provisions, but also because of the (overlapping) horizontal rules regarding transparency. In the same vein, providers mention that implementation of the provisions regarding transparency require a significant amount of work on the part of network operators.
- With regard to independent price and quality of service comparison tools, network operators noted that there is a need for balance between increased transparency for end-users on the one hand, and the inherent difficulties and complexity of these tools on the other hand, especially when services are offered in bundles.
- With the large amount of available information, end-user associations mentioned that there is a value added for NRAs to promote the use of standard templates, which allow end-users to compare services from different providers more easily.
- Network operators noted that they already offer price comparison tools on their own initiative. In the same vein, they mention that transparency measures are suitable for self-/co-regulation. They mention successful examples with regard to traffic management in internet access services in the UK, where a Code of Practice is implemented by the industry which goes well beyond the formal transparency regulation.²⁷¹ Other examples of self-/co-regulation mentioned favourably are number portability in the Netherlands, and porting procedures and QoS measurements in Bulgaria.

In regard to publication of quality of service information and setting minimum standards, we note the following comments:

- In their responses to the Commission's consultation, the majority of ministries, associations, service providers and IT actors (including OTTs), broadcasters, trade unions and consumers agreed that there is a need for further end-user rights on transparency regarding the quality of service of internet access services. In most cases, respondents preferred minimum harmonisation.

²⁷¹ WIK-Consult (2015), Review of the Open Internet Codes. Report for the Broadband Stakeholder Group (<http://www.wik.org/fileadmin/Studien/2015/WIK-Review-of-the-Open-Internet-Codes-November-15.pdf>).

- In our own stakeholder interviews, some operators noted that the current quality of their services is above the minimum requirements of regulation as a result of competition in the market. However, end-user associations argued that, although regulation has driven competition, it has not increased service quality in terms of broadband and mobile coverage.
- Furthermore, network operators whom we interviewed mentioned the UK as an example of functioning self-regulation with a speed code for fixed broadband, transparency regarding traffic management, and open internet rules.

2.5.4.3 Ability to switch providers

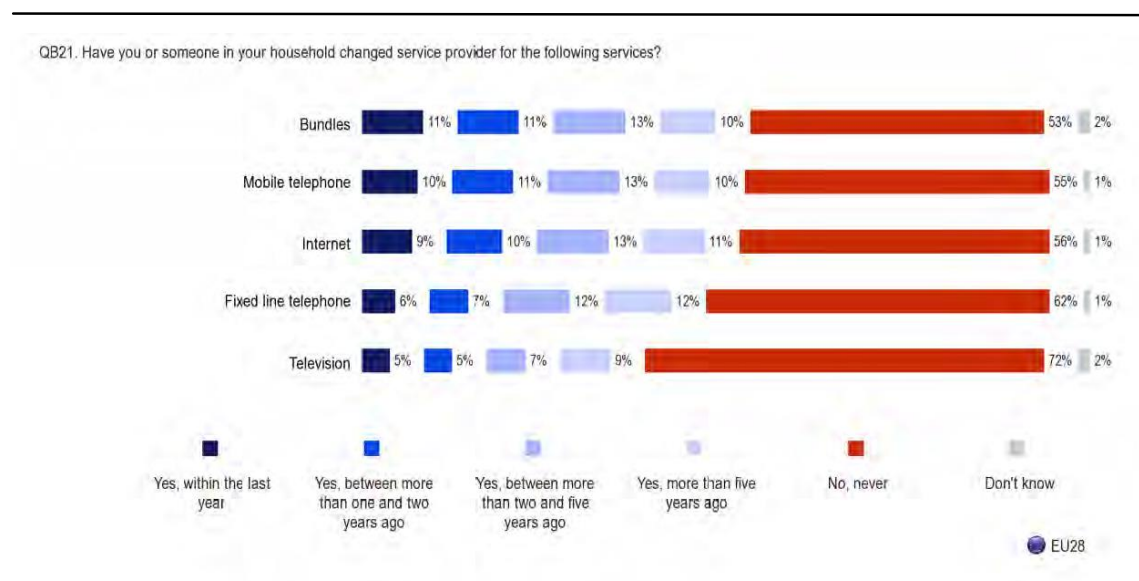
An important objective of end-user provisions is to facilitate switching between service providers. Switching allows customers to adapt communications services to new needs and preferences and/or benefit from the lower prices or better quality of service of competing offers. In the following subsections, we summarise available evidence for bundles, fixed telephony and mobile telephony.

2.5.4.3.1 Switching of provider for bundles

The Eurobarometer survey 2014 showed that, on average in the EU, 45% of respondents have switched the provider of their bundle in the past five years.²⁷² For subscribers to mobile and internet access services, the percentage of respondents who have switched is fairly high (44% and 43%, respectively), but for the traditional fixed line telephony and television services, it is somewhat lower (37% and 26%, respectively). This is shown in Figure 45.

²⁷² European Commission (2014), E-communications and telecom single market household survey report, Special Eurobarometer 414, p. 82.

Figure 45: Percentage of households who have changed provider in the past, EU, January 2014



Source: European Commission (2014), E-Communications and Telecom Single Market Household Survey Report, Special Eurobarometer 414, p. 82

The Eurobarometer survey carried out in January 2014 showed large variations at Member State level in the extent of switching, especially for bundles.²⁷³ Households in Greece were the most likely to have changed their bundle service provider in the past five years (68%), followed by those in Slovakia (65%) and Portugal (64%). Households in Romania are least likely to have switched bundle provider (20%).

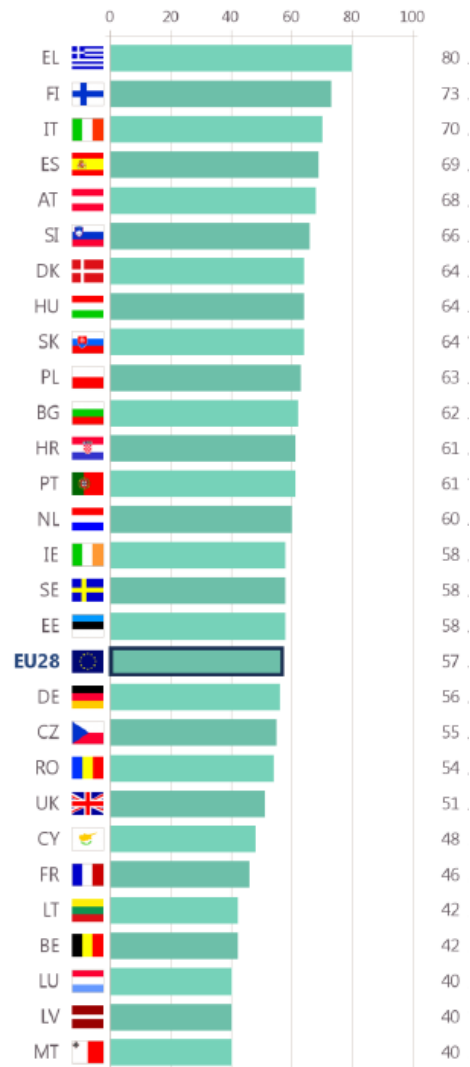
According to the Eurobarometer survey carried out in October 2015, bundle switching has increased compared to the results of the 2014 survey.²⁷⁴ The share of households who have a bundle *and* have switched in the past increased on average from 45% to 57%.

Again, the extent of switching varies largely between Member States, but the ranking changed. The least switching can be found in Luxembourg, Latvia and Malta, where only 40% of those who have a bundle said that they had switched provider in the past five years. In turn, the percentage in Greece remains the highest (80%) (see Figure 46).

²⁷³ European Commission (2014), E-communications and telecom single market household survey report, Special Eurobarometer 414, p. 83.

²⁷⁴ Switching for stand-alone services is no longer included in the survey.

Figure 46: Percentage of households who have a bundle and who have changed provider in the past, EU, October 2015



Source: European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, p. 86.

We constructed Table 39 to see if there is a relationship between the implementation of relevant provisions (input parameters) and the extent of switching for bundles (outcome parameter). In the table, Member States are ranked by the share of households that have switched their bundle provider in the past (drawn from Figure 46). The Table links the extent of switching in Member States with the imposition of end-user provisions relevant for switching; these include:

- (i) the maximum initial contract duration of 24 months,
- (ii) the availability of a 12 month contract option,
- (iii) the notice period to terminate the contract after the initial period,
- (iv) the maximum penalty for cancellation during initial contract time,
- (v) whether automatic renewal (roll-over) is allowed,
- (vi) the maximum allowed renewal duration,
- (vii) whether the switching process is led by receiving operator (RO) or donor operator (DO),
- (viii) whether there is regulation to minimise service disruption,
- (ix) whether there is a compensation/refund in case of delay during switching,
- (x) whether there is a regulation for fixed number porting overall process, and
- (xi) whether there is a maximum timeframe for fixed number porting overall process.

Table 39: Extent of switching of bundles and imposition of relevant end-user provisions, EU

	% of HH which changed bundle provider in the past (2015)	24 months maximum initial contract duration	12 month contract option	Notice period to terminate contract after initial period	Maximum penalty for cancellation during initial contract time	Automatic renewal (roll-over) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption	Compensation / refund in case of delay	Rules for fixed number porting overall process	Maximum no. of work-days for overall fixed number porting process
GR	80,0%	Yes	Yes.	No	No	No	No	RO (fixed voice + BB) number portability & local loop)	Yes	Yes	Yes	2
FI	73,0%	Yes	Yes	Yes, 2 weeks	No	Yes	No	RO (fixed voice)	Yes	Yes	Yes	5
IT	70,0%	Yes (for businesses might be longer)	Yes	Yes, 30 days	Yes	Yes	No	RO (fixed voice and broadband)	yes	Yes	Yes	9
ES	69,0%	No	No	Yes	No	No	No	RO (fixed voice)	Yes	No	Yes	1 to 6
AT	68,0%	Yes	Yes	No	No	Yes	No	RO (fixed voice)	Yes	Yes	Yes	10
SI	66,0%	Yes	Yes	No	No	Yes	No	RO (fixed voice)	Yes	No	Yes	1
DK	64,0%	Yes, 6 months	No	Yes	No	Yes	Yes	RO (fixed voice)	Yes (voice)	Yes	No	NA
SK	64,0%	Yes	Yes	No	No	No	No	RO (fixed voice)	No	Yes	Yes	4
HU	64,0%	Yes	Yes	Yes, 30- 60 days max	No	No	Yes	RO (fixed voice)	Yes	Yes	Yes	3
PL	63,0%	Yes	Yes	No	Yes	No	No	RO (fixed voice)	Yes	Yes	Yes	7

	% of HH which changed bundle provider in the past (2015)	24 months maximum initial contract duration	12 month contract option	Notice period to terminate contract after initial period	Maximum penalty for cancellation during initial contract time	Automatic renewal (roll-over) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption	Compensation / refund in case of delay	Rules for fixed number porting overall process	Maximum no. of work-days for overall fixed number porting process
BG	62,0%	Yes	Yes	30 days	Yes	No	Yes, 12 months	No	No	No	Yes	5
HR	61,0%	Yes	Yes	Yes, any time	Yes	Yes	No	RO (fixed voice and broadband)	Yes (voice + BB)	Yes	Yes	5
PT	61,0%	Yes, consumers only	Yes	No	No	Yes	No	RO (fixed voice)	Yes	Yes	Yes,	1
NL	60,0%	Yes	Yes	yes, 1 month	No	Yes	No	RO (fixed voice)	Yes	No	Yes	10
IE	58,0%	Yes	Yes	No	No	Yes	No	RO (fixed voice and broadband)	No	Yes	No	NA
SE	58,0%	Yes	Yes	Yes, 1 month	No, in practice remainder contract	Yes	No	RO (fixed voice)	No	No	Yes	4 (res), 11 (bus)
EE	58,0%	Yes	Yes	Yes, reasonable time	No	Yes	Yes, 12 months	No	Yes	Yes	Yes	39
DE	56,0%	Yes	Yes	No	No	No	No	RO (fixed voice + BB). Customer lead if coming from or to cable network	No	No	Yes	1

	% of HH which changed bundle provider in the past (2015)	24 months maximum initial contract duration	12 month contract option	Notice period to terminate contract after initial period	Maximum penalty for cancellation during initial contract time	Automatic renewal (roll-over) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Rules to minimise service disruption	Compensation / refund in case of delay	Rules for fixed number porting overall process	Maximum no. of work-days for overall fixed number porting process
CZ	55,0%	Yes	Yes	Yes, 1 month	Yes	Yes	No	RO (fixed voice)	Yes (voice)	Yes	Yes	4
RO	54,0%	Yes	Yes	No	No	Yes	No	RO (fixed voice)	No	No	Yes	3
UK	51,0%	Yes, for consumer contracts	Yes (consumers)	No, general law applies (1 month)	No, general civil law applies	No, general civil law applies	No, general civil law applies	RO (fixed voice)	No	No	No	NA
CY	48,0%	Yes	Yes	Yes, anytime	Yes	Yes	No	RO (fixed voice)	Yes (voice)	No	Yes	14
FR	46,0%	Yes	Yes	Yes, 10 days	Yes	Yes	No	RO (fixed voice)	Yes	Yes	Yes	3 (res), 7 (bus)
BE	42,0%	Yes	Yes	Any time	Yes	Yes	Yes	RO (fixed voice)	No	No	Yes	3
LT	42,0%	Yes	Yes	Yes, for indefinite contracts, anytime with 5 days' notice period.	Yes	Yes	No	RO (fixed voice)	Yes	No	Yes	1
LV	40,0%	Yes	Yes	Yes, 1 month	No	Yes	No	DO (fixed voice)	Yes	Yes	Yes	16
LU	40,0%	Yes	No	Yes, 1 month	Yes	Yes	No	RO (fixed voice)	Yes	No	Yes	1
MT	40,0%	Yes	Yes	No	Yes	Yes	No	RO (fixed voice)	Yes	No	Yes	22

Source: WIK Consult / Cullen International

As was the case for a similar table addressing ease of comparability of offers, this table does not suggest a clear relationship between the extent of switching for bundles and the detailed end-user provisions that have been implemented by the Member States.

Other factors may be at work that influence the relationship between the extent of bundle switching and the detailed sector-specific provisions imposed:

- Possible factors include fixed broadband coverage, fixed broadband penetration, fixed broadband competition as indicated by the HHI, and GDP per inhabitant. However, there is no significant linkage between these factors and extent of switching in the past.²⁷⁵
- Other possible factors that might have an impact on switching include socio-demographic factors. The Eurobarometer survey shows that switching rates tend to increase with younger households, smaller household size, more urbanised territories, and with greater Internet usage. Socio-demographic differences between Member States, therefore, will also have an impact on the ranking of Member States by switching rates.

2.5.4.3.2 Switching with fixed number portability

Another indicator for switching is the percentage of subscribers that have ported their number in the last year. Fixed number porting is analysed in this section.²⁷⁶ The porting rates are in general lower than the total number of subscribers switching provider as there are also customers who do not keep their number when switching. Furthermore, the switching figures used in the previous section are for the last 10 years, while the porting figures in this section relate to a single year. Figure 47 shows the percentage of fixed telephony subscribers that have ported their fixed number in 2013 and 2014 as % of the installed base (to make the figures comparable across the EU).

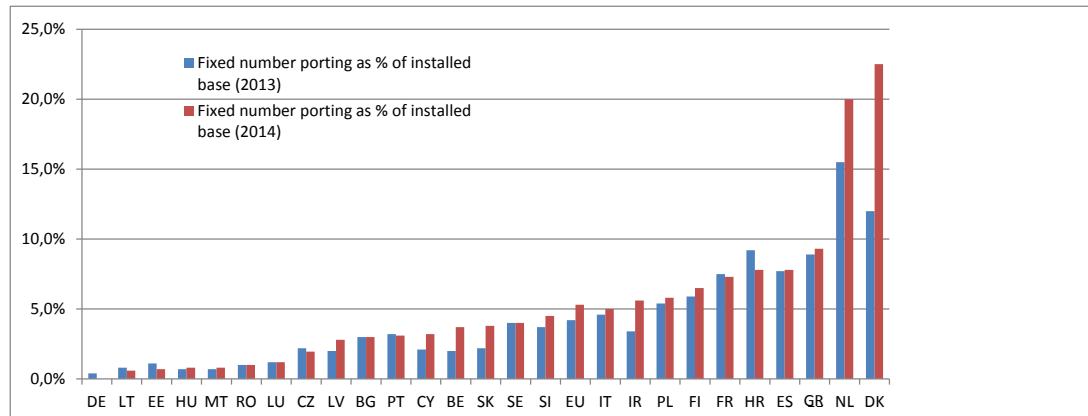
Aggregate switching with fixed number porting for the EU as a whole was 5,3% in 2014, with a coefficient of variation of 1.0.

Denmark and the Netherlands rank highest with respectively 23% and 20% of the fixed network installed base who have switched in the last year. Lithuania, Estonia, Hungary and Malta rank lowest with less than 1%.

²⁷⁵ Correlation coefficients are -0,12, -0,24, -0,10, respectively -0,25.

²⁷⁶ For switching with mobile number porting, see the following section.

Figure 47: Ported fixed numbers as a percentage of total fixed subscriptions, EU, 2013-14



Source: WIK calculations. Date sources: European Commission: Implementation Report 2015; European Commission: Financial indicators, fixed and mobile telephony, broadcasting indicators; IDATE database.

Data on switching for fixed telephony gathered by the 2013 EU Consumer Market Monitoring Survey confirms the large variation between Member States. These are included in the Appendix.

Table 40 ranks Member States by the share of households that have switched their fixed telephony provider and ported their number over a 9 month period. It is interesting to see that Denmark, which scored lowest on ease of comparison (see Table 38), scores highest in fixed number porting (22% of installed fixed base have ported in 2015). Hungary, Malta, Estonia and Lithuania, where this percentage is below 1%, rank at the bottom of the list. These low results on switching seem partly aligned with the ease of comparability, which was also low for Malta, Lithuania and (to a lesser extent) Estonia.

The table makes it possible to relate the extent of fixed number porting with how Member States implemented provisions relevant for switching of the fixed telephony provider. These are:

- (i) The maximum initial contract duration of 24 months,
- (ii) The availability of a 12 month contract option,
- (iii) The notice period to terminate the contract after the initial period,
- (iv) The maximum penalty for cancellation during initial contract time,
- (v) Whether automatic renewal (roll-over) is allowed,

- (vi) Maximum penalty for cancellation during initial contract time,
- (vii) The maximum allowed renewal duration,
- (viii) Whether the switching process is led by receiving operator (RO) or donor operator (DO),
- (ix) Whether there is regulation to minimise service disruption,
- (x) Whether there is a compensation/refund in case of delay during switching,
- (xi) Whether there is a regulation for fixed number porting overall process, and
- (xii) Whether there is a maximum timeframe for fixed number porting overall process.

Table 40: Extent of switching of fixed services based on fixed number porting and imposition of related end-user provisions

	Fixed number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial oncontract time	Automatic renewal (roll-over) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/refund in case of delay	Regulation for fixed number porting overall process	Max time for fixed number porting overall process (working day)
DK	22,5%	Yes, 6 months	No	Yes	No	Yes	Yes	RO (fixed voice)	Yes (voice)	Yes	No	NA
NL	20,0%	Yes	Yes	Yes, 1 month	No	Yes	No	RO (fixed voice)	Yes	No	Yes	10
GR	9,3%	Yes	Yes	No	No	No	No	RO (fixed voice + BB) number portability & local loop)	Yes	Yes	Yes	2
ES	7,8%	No	No	Yes	No	No	No	RO (fixed voice)	Yes	No	Yes	1 to 6
HR	7,8%	Yes	Yes	Yes, any time	Yes	Yes	No	RO (fixed voice + BB)	Yes (voice + BB)	Yes	Yes	5
FR	7,3%	Yes	Yes	Yes, 10 days	Yes	Yes	No	RO (fixed voice)	Yes	Yes	Yes	3 (for residential end users), 7 (for business end users)
FI	6,5%	Yes	Yes	Yes, 2 weeks	No	Yes	No	RO (fixed voice)	Yes	Yes	Yes	5

	Fixed number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial ontract time	Automatic renewal (roll-over) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/ refund in case of delay	Regulation for fixed number porting overall process	Max time for fixed number porting overall process (working day)
PL	5,8%	Yes	Yes	No	Yes	No	No	RO (fixed voice)	Yes	Yes	Yes	7
IE	5,6%	Yes	Yes	No	No	Yes	No	RO (fixed voice and BB)	No	Yes	No	NA
IT	5,0%	Yes (for businesses might be longer)	Yes	Yes, 30 days	Yes	Yes	No	RO (fixed voice and BB)	Yes	Yes	Yes	9
SI	4,5%	Yes	Yes	No	No	Yes	No	RO (fixed voice)	Yes	No	Yes	1
SE	4,0%	Yes	Yes	Yes, 1 month	No, in practice remainder of the contract	Yes	No	RO (fixed voice)	No	No	Yes	4 (for residential end users), 11 (for business end users)
SK	3,8%	Yes	Yes	No	No	No	No	RO (fixed voice)	No	Yes	Yes	4
BE	3,7%	Yes	Yes	Any time	Yes	Yes	Yes	RO (fixed voice)	No	No	Yes	3
CY	3,2%	Yes	Yes	Yes, anytime	Yes	Yes	No	RO (fixed voice)	Yes (voice)	No	Yes	14
PT	3,1%	Yes, consumers only	Yes	No	No	Yes	No	RO (fixed voice)	Yes	Yes	Yes,	1

	Fixed number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial ontract time	Automatic renewal (roll-over) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/ refund in case of delay	Regulation for fixed number porting overall process	Max time for fixed number porting overall process (working day)
BG	3,0%	Yes	Yes	30 days	Yes	No	Yes, 12 months	No	No	No	Yes	5
LV	2,8%	Yes	Yes	Yes, 1 month	No	Yes	No	DO (fixed vocie)	Yes	Yes	Yes	16
CZ	2,0%	Yes	Yes	Yes, 1 month	Yes	Yes	No	RO (fixed voice)	Yes (voice)	Yes	Yes	4
LU	1,2%	Yes	No	Yes, 1 month	Yes	Yes	No	RO (fixed voice)	Yes	No	Yes	1
RO	1,0%	Yes	Yes	No	No	Yes	No	RO (fixed voice)	No	No	Yes	3
HU	0,8%	Yes	Yes	Yes, At least 30 days, no more than 60 days	No	No	Yes	RO (fixed voice)	Yes	Yes	Yes	3
MT	0,8%	Yes	Yes	No	Yes	Yes	No	RO (fixed voice)	Yes	No	Yes	22
EE	0,7%	Yes	Yes	Yes, reasonable time	No	Yes	Yes, 12 months	No	Yes	Yes	Yes	39
LT	0,6%	Yes	Yes	Yes, for indefinite contracts, anytime with 5 days notice period	Yes	Yes	No	RO (fixed voice)	Yes	No	Yes	1

	Fixed number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	Must a 12 month option be offered?	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial ontract time	Automatic renewal (roll-over) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/ refund in case of delay	Regulation for fixed number porting overall process	Max time for fixed number porting overall process (working day)
DE		Yes	Yes	No	No	Yes	No	RO (fixed voice)	Yes	Yes	Yes	10
UK		Yes	Yes	No	No	No	No	RO (fixed voice + BB). Customer lead if switching from cable operator	No	No	Yes	1
AT		Yes, for consumer contracts	Yes (consumers)	No, general law applies (1 month for consumers)	No, general civil law applies	No, general civil law applies	No, general civil law applies	RO (fixed voice)	No	No	No	NA

Source: WIK Consult /Cullen International

The Table does not suggest that there is a systematic relationship between extent of switching with fixed number porting and the relevant individual end-user provisions that have been imposed. We did not find a linkage between the extent of switching with porting of fixed numbers and the maximum timeframe for the overall porting process.²⁷⁷

In addition, we checked whether a number of external factors can explain differences in switching with fixed number porting:

- There is a weak linkage between extent of switching with fixed number porting and fixed broadband penetration.²⁷⁸
- There is no discernible linkage between the extent of switching with fixed number porting and fixed broadband coverage, fixed broadband competition as indicated by the HHI, or GDP per inhabitant.²⁷⁹

2.5.4.3.3 Switching with mobile number portability

A further indicator for switching is the percentage of subscribers that have ported their mobile number. Figure 48 shows the percentage of mobile telephony subscribers that have ported their mobile number within a 9-month period in in 2013 and 2014.

Aggregate switching with mobile number porting for the EU as a whole was 4,2% in 2014, with a coefficient of variation of 0,69.

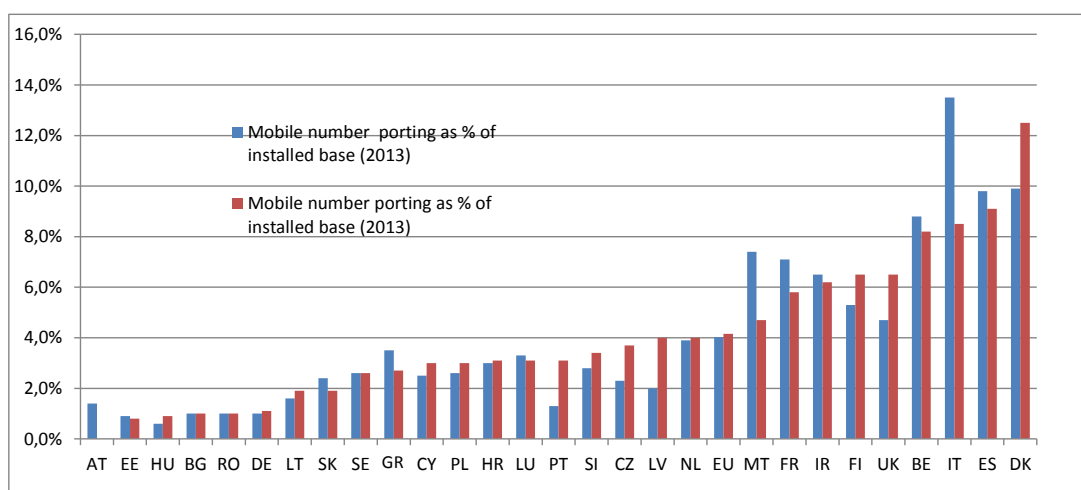
Denmark ranks first for fixed number porting (12%) with Spain, Italy and Belgium following with around 8%. Hungary and Estonia, where this percentage is below 1%, rank at the bottom of the list.

²⁷⁷ The correlation coefficient is -0,19.

²⁷⁸ The correlation coefficient is 0,54.

²⁷⁹ The correlation coefficients are 0,28, 0,04, and 0,15, respectively.

Figure 48: Ported mobile numbers as a percentage of total mobile subscriptions, EU, 2013-14



Source: WIK calculations. Date sources: European Commission: Implementation report 2015; European Commission: Financial indicators, fixed and mobile telephony, broadcasting indicators; IDATE database.

Data on switching for mobile telephony gathered by the 2013 EU Consumer Market Monitoring Survey shows a similar variation across Member States; results are included in the Appendix.

Table 41 ranks Member States by the share of households that have switched their mobile telephony provider and ported their mobile number (based on the same data as used for Figure 48). The Table enables comparison between the amount of mobile switching that occurred, and the end-user measures that the Member States implemented in support of mobile switching. These are:

- (i) The maximum initial contract duration of 24 months,
- (ii) The 12 month contract option,
- (iii) The notice period to terminate the contract after the initial period,
- (iv) The maximum penalty for cancellation during initial contract time,
- (v) Maximum penalty for cancellation during initial contract time,
- (vi) The maximum compensation for subsidised handset,
- (vii) The maximum period for locking handsets,
- (viii) Whether automatic renewal (roll-over) is allowed,
- (ix) The maximum allowed renewal duration,
- (x) Whether the switching process is led by receiving operator (RO) or donor operator (DO),
- (xi) Whether there are rules to minimise service disruption,
- (xii) Whether there is a compensation/refund in case of delay during switching,
- (xiii) Whether there are rules for the mobile number porting overall process, and
- (xiv) Whether there is a maximum timeframe for mobile number porting overall process.

Table 41: Extent of switching of mobile services based on mobile number porting and imposition of related end-user measures

	Mobile number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	12 month contract option	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial contract time	Maximum compensation set for subsidised handset	Maximum period to lock handset regulated	Automatic renewal (rollover) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/refund in case of delay	Regulation for mobile number porting overall process	Maximum timeframe for fixed number porting overall process (working day)
DK	12,5%	Yes, 6 months	No	Yes	No	No	Yes, same as initial commitment period	Yes	Yes	RO	Yes	Yes	Yes	1
ES	9,1%	No	No	Yes	No	No	No	No	No	RO	Yes	No	Yes	1
IT	8,5%	Yes (for businesses might be longer)	Yes	Yes, 30 days	Yes	Yes	Yes, 18 months	Yes	No	RO	Yes	Yes	Yes	1
BE	8,2%	Yes	Yes	Any time	Yes	Yes	No	Yes	Yes	RO	No	No	Yes	3
FI	6,5%	Yes	Yes	Yes, 2 weeks	No	Yes	Yes, equal to the contract term	Yes	No	RO	Yes	Yes	Yes	5

	Mobile number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	12 month contract option	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial contract time	Maximum compensation set for subsidised handset	Maximum period to lock handset regulated	Automatic renewal (rollover) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/ refund in case of delay	Regulation for mobile number porting overall process	Maximum timeframe for fixed number porting overall process (working day)
UK	6,5%	Yes	Yes	No	No	No	No	No	No	DO, Proposed: RO or automated DO process (where the customer request a code to the DO)	No	No	Yes	1
IE	6,2%	Yes	Yes	No	No	No	No	Yes	No	RO, (by commercial practice – not regulated)	No	No	No	NA
FR	5,8%	Yes	Yes	Yes, 10 days	Yes	No	Yes, 6 months	Yes	No	RO	Yes	Yes	Yes	3
MT	4,7%	Yes	Yes	No	Yes	Yes	No	Yes	No	RO	Yes	No	Yes	2
LV	4,0%	Yes	Yes	Yes, 1 month	No	No	No	Yes	No	DO	Yes	Yes	Yes	16

	Mobile number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	12 month contract option	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial contract time	Maximum compensation set for subsidised handset	Maximum period to lock handset regulated	Automatic renewal (rollover) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/refund in case of delay	Regulation for mobile number porting overall process	Maximum timeframe for fixed number porting overall process (working day)
NL	4,0%	Yes	Yes	Yes, 1 month	No	No	No, But period of 12 months agreed among operators and NRA after a court ruling in March 2002.	Yes	No	RO	Yes	No	Yes	10
CZ	3,7%	Yes	Yes	Yes, 1 month	Yes	No	No	Yes	No	RO	Yes	Yes	Yes	4
SI	3,4%	Yes	Yes	No	No	Yes	No	Yes	No	RO	Yes	No	Yes	1
HR	3,1%	Yes	Yes	Yes, any time	Yes	No	Yes	Yes	No	RO	Yes	Yes	Yes	3
LU	3,1%	Yes	No	Yes, 1 month	Yes	No	No	Yes	No	RO	Yes	No	Yes	NA
PT	3,1%	Yes, consumers only	Yes	No	No	Yes	No	Yes	No	RO	Yes	Yes	Yes,	1
CY	3,0%	Yes	Yes	Yes, anytime	Yes	No	NA	Yes	No	RO	No	No	Yes	14
PL	3,0%	Yes	Yes	No	Yes	Yes	No	No	No	RO	Yes	Yes	Yes	1

	Mobile number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	12 month contract option	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial contract time	Maximum compensation set for subsidised handset	Maximum period to lock handset regulated	Automatic renewal (rollover) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/ refund in case of delay	Regulation for mobile number porting overall process	Maximum timeframe for fixed number porting overall process (working day)
GR	2,7%	Yes	Yes.	No	No	No	NA	No	No	RO	Yes	Yes	Yes	2
SE	2,6%	Yes	Yes	Yes, 1 month	No, in practice reminder of the contract	No	Yes, same as initial commitment period	Yes	No	RO	No	No	Yes	4
LT	1,9%	Yes	Yes	Yes, for indefinite contracts, anytime with 5 days notice period.	Yes	Yes	No	Yes	No	RO	Yes	No	Yes	1
SK	1,9%	Yes	Yes	No	No	No	No	No	No	RO	No	Yes	Yes	4
DE	1,1%	Yes	Yes	No	No	No	No	Yes	No	RO	Yes	Yes	Yes	7
BG	1,0%	Yes	Yes	30 days	Yes	No	No	No	Yes, 12 months	NA	No	No	Yes	2
RO	1,0%	Yes	Yes	No	No	No	No	Yes	No	RO	No	No	Yes	3
HU	0,9%	Yes	Yes	Yes, At least 30 days but no more than 60 days	No	Yes	No	No	Yes	RO	Yes	Yes	Yes	3

	Mobile number porting as % of installed base (2014)	Maximum allowed initial term of 24 months	12 month contract option	Notice period to terminate the contract after initial period	Maximum penalty for cancellation during initial contract time	Maximum compensation set for subsidised handset	Maximum period to lock handset regulated	Automatic renewal (rollover) allowed	Maximum allowed renewal duration	Switching process led by receiving operator (RO) or donor operator (DO)	Is there regulation to minimise service disruption	Is there regulation on compensation/ refund in case of delay	Regulation for mobile number porting overall process	Maximum timeframe for fixed number porting overall process (working day)
EE	0,8%	Yes	Yes	Yes, reasonable time	No	No	Na	Yes	Yes, 12 months	Both	Yes	Yes	Yes	25
AT		Yes, for consumer contracts	Yes (consumers)	No, general law applies (1 month for consumers)	No, general civil law applies	No, general civil law applies	No	No, general civil law applies	No, general civil law applies	RO	Yes	No	No	NA

Source: WIK Consult / Cullen International

As with fixed telephony switching, the table does not suggest a systematic relationship between the extent of switching with mobile number porting and the relevant end-user provisions that have been implemented. There is also no strong linkage between switching and maximum timeframe for mobile number porting.²⁸⁰

Finally, there is no obvious linkage between the extent of switching with mobile number porting and external factors such as mobile competition (as indicated by the HHI), or GDP per inhabitant.²⁸¹

2.5.4.3.4 Stakeholder views

The general conclusion from the stakeholder interviews and the responses to the Commission's consultation is that number porting and switching works well.

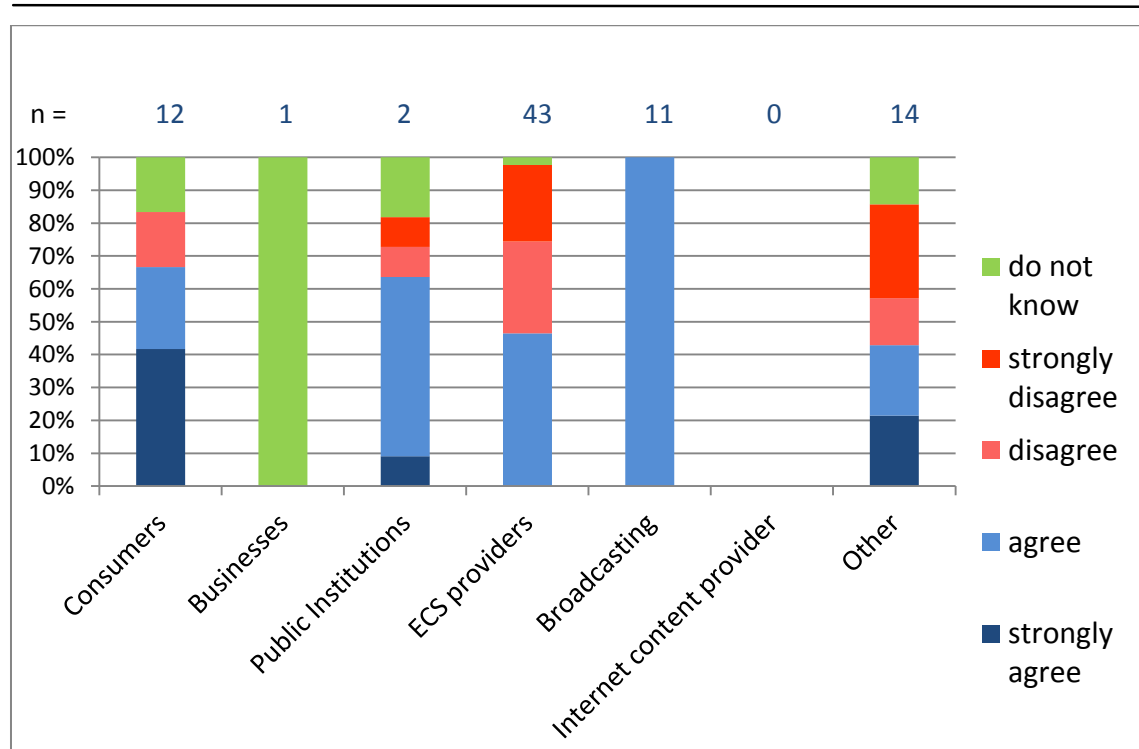
From the Commission's consultation the following responses regarding switching are further noted (as illustrated in Figure 49):

- 85% of respondents agreed that the current number portability provisions allow for efficient implementation. This opinion is supported not only by consumers and public institutions but also by electronic communications service providers self. Only 5% of respondents disagreed.
- 48% of the respondents, mainly consumers and broadcasters, agreed that the scope of the number portability regime should be adapted to apply to other elements which could be a barrier to switching. However, 39% of respondents disagreed, among them internet service providers, and other parties. Electronic communications service providers partly equally agreed and disagreed.
- 54% of respondents (see below Figure for details) agreed that the current rules on provider switching should be adapted to bundles, including to bundles of electronic communications services and other services. However, 36% of respondents disagreed. The pro and con responses were spread over almost all categories of respondents, except for businesses who remained neutral and a broadcaster who agreed.

²⁸⁰ The correlation coefficient is 0,39.

²⁸¹ The correlation coefficients are -0,35 respectively 0,26.

Figure 49: Respondents to EC consultation question 132 on whether the current rules on provider switching need to be adapted in view of the increasing bundling



Source: European Commission (2016), Synopsis report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, 2016

- End-user associations indicated similar concerns about different contract periods for bundle components, but also mentioned advertising practices of presenting low prices for popular products in the bundle (e.g. mobile) in the headlines, whilst “hiding” much higher costs of less popular services in small prints. Furthermore, they remarked that the gaining operator led process should also apply for bundles.
- End-user associations also said that end-users should be able to terminate any individual service within a bundle and that renewal of one service should not be used to renew the contract for the entire bundle. Equipment linked to one service should not be used to lock-in end-users to other services in the bundle.

From our interviews with stakeholders, the following comments were noted on switching:

- Network operators from the UK confirmed the generally positive view, but noted that there are issues with fixed number porting between telecoms and cable networks.
- Other issues noted on switching referred to internet access services, where bundling with television services seemed to create concerns. Other respondents noted with regard to television services that end-users are not actually transferred between providers, but discontinue their existing service and subscribe to another provider.
- With regard to bundling there were also concerns from end-user associations, such as practices where adding services to an existing bundle restarted the contract period, or different contract durations for bundle elements leading to overall a longer contract duration.
- Mobile number portability seems to function generally well, however respondents mentioned the importance to still focus on the need of avoiding service outages and also mentioned that the 1 day activation time might be too ambitious.
- Number porting arrangements seem to differ from country to country. In this respect there were remarks on the importance of full harmonisation, also considering that not all NRAs have the competence to implement specific number portability rules.
- In regard to extending the portability provisions to data, stakeholders mentioned that data porting is addressed in the General Data Protection Regulation. In this context, OTT providers remarked that user data can play a role in switching; however, this is limited to certain services such as banking and health related services. In other instances, user data is not believed to be a barrier to switching as the end-user can have simultaneous accounts and services.

2.5.5 Overlap of sector-specific by horizontal provisions

2.5.5.1 General

Several directives have been enacted for the last 20 years in the field of consumer protection. A distinction can be made between *material* consumer protection Law and *procedural* consumer protection law.

Among *material* consumer protection law, reference shall be made i.a. to:

- Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council²⁸² (hereafter, Consumer Rights Directive - **CRD**) ;
- Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market²⁸³ (hereafter, Directive (2006/123/EC) on Services - **SD**);
- Directive 2006/114/EC of the European Parliament and of the Council of 12 December 2006 concerning misleading and comparative advertising²⁸⁴;
- Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council (Unfair Commercial Practices Directive²⁸⁵, hereafter also **UCPD**);
- Council Directive 93/13/EEC of 5 April 1993 on unfair terms in consumer contracts²⁸⁶ (hereafter Unfair Contract Terms Directive - **UCTD**).

Among *procedural* consumer protection law, reference shall be made i.a. to:

- Regulation (EU) No 524/2013 of the European Parliament and of the Council of 21 May 2013 on online dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (hereafter Regulation

²⁸² [2011] OJ L304/64.

²⁸³ [2006] OJ 2006 L376/36.

²⁸⁴ [2006] OJ 2006 L376/21.

²⁸⁵ [2005] OJ 2005 L149/22.

²⁸⁶ [1993] OJ 1993 L95/29.

on Consumer ODR²⁸⁷, Online Dispute Resolution Regulation or **ODR** Regulation);

- Directive 2013/11/EU of the European Parliament and of the Council of 21 May 2013 on alternative dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Directive on Consumer ADR²⁸⁸ or ADR Directive or Alternative Dispute Resolution Directive or **ADR**).

The aforementioned directives/regulations are considered to be *horizontal* consumer protection legislation because their scope is quite broad. More precisely, they usually apply in relationships between professional traders and consumers, no matter the object of the agreement. For the sake of completeness, we also mentioned directives with scope not limited to B2C relationships, such as the Directive 2006/123/EC on Services, applicable to services, between “providers” and “recipients” (being agreed that “recipients” are defined as “any natural person who is a national of a Member State or who benefits from rights conferred upon him by Community acts, or any legal person as referred to in Article 48 of the Treaty and established in a Member State, who, for *professional or non-professional purposes*, uses, or wishes to use, a service”).²⁸⁹

Table 42 highlights the overlap between EU level horizontal consumer protection rules and the key provisions of the Universal Service Directive examined.

Table 42: Overlap between key provisions of the USD and horizontal rules

	Applicable to ECS?	Similar protection rules	Other protection rules
Consumer Rights DIR (2011)	v	v	v
Misleading Advertising DIR (2006)	v		v
DIR on Services (2006)	x	v	v
Unfair Commercial Practices DIR (2005)	v	(v)	v
Unfair Contract Terms DIR (1993)	v	(v)	v
ODR Regulation (2013)	v		v
ADR DIR (2013)	v	v	

²⁸⁷ [2013] OJ 2013 L165/1.

²⁸⁸ [2013] OJ 2013 L165/63.

²⁸⁹ Art. 4(3) Directive 2006/123/EC. Underlining by us.

Column 2 shows that most directives/regulations belonging to the so-called horizontal consumer protection framework are normally applicable to publicly available electronic communication services (in other words, when the USD is also applicable). This is however not the case for the Directive 2006/123/EC on Services (see Article 2 stating that *“This Directive shall not apply to the following activities [...] c) electronic communications services and networks, and associated facilities and services, with respect to matters covered by Directives 2002/19/EC, 2002/20/EC, 2002/21/EC, 2002/22/EC and 2002/58/EC”*).

Columns 3 and 4 show that, in most horizontal directives/regulations, protection rules are prescribed which are both similar and complementary to the key USD provisions examined.

Table 43 further details the degree to which horizontal consumer protection directives/regulations overlap key USD provisions.

Table 43: Horizontal consumer protection law overlapping key USD provisions

	CRD	ADRD	(SD)	UCPD	UCTD
Terms & conditions (Article 20 USD)	√		√		
Publication of information (Article 20 and 22 USD)	√		√	(√)	(√)
Comparison tools (Article 21 USD)					
Publication QoS information (Article 22 USD)			√		
Minimum QoS levels (Article 22 USD)			√		(√)
Contract duration/termination (Articles 20 and 30 USD)				(√)	(√)
Provider switching process (Article 30 USD)				(√)	
Number portability (Article 30 USD)					
Dispute resolution (Article 34 USD)	√	√	√		

2.5.5.2 Provision of information (Article 20 USD)

Article 5 of CRD and Article 22 of the Directive on Services prescribe the provision of information with similar object as Article 20 USD. This is mainly the case with regard to the identity of the provider, the description of the services, the price and the duration of the agreement.

Table 44: Information duties under Universal Service Directive, Consumer Rights Directive and Directive on Services

Article 20 of the Universal Service Directive	Article 5 of the Consumer Rights Directive	Article 22 of the Directive on Services
<p>1. Member States shall ensure that, when subscribing to services providing connection to a public communications network and/or publicly available electronic communications services, consumers, and other end-users so requesting, have a right to a contract with an undertaking or undertakings providing such connection and/or services. The contract shall specify in a clear, comprehensive and easily accessible form at least:</p> <p>(a) the identity and address of the undertaking;</p> <p>(b) the services provided, including in particular,</p> <p>— whether or not access to emergency services and caller location information is being provided, and any limitations on the provision of emergency services under Article 26,</p> <p>— information on any other conditions limiting access to and/or use of services and applications, where such conditions are permitted under national law in accordance with Community law,</p> <p>— the minimum service quality levels offered, namely the time for the initial connection and, where appropriate, other quality of service parameters, as defined by the national regulatory authorities,</p> <p>— information on any procedures put in place by the undertaking to measure and shape traffic so as to avoid filling or overfilling a network link, and information on how those procedures could impact on service quality,</p> <p>— the types of maintenance service offered and customer support services provided, as well as the means of contacting these services,</p> <p>— any restrictions imposed by the provider on the use of terminal equipment supplied;</p>	<p>1. Before the consumer is bound by a contract other than a distance or an off-premises contract, or any corresponding offer, the trader shall provide the consumer with the following information in a clear and comprehensible manner, if that information is not already apparent from the context:</p> <p>(a) the main characteristics of the goods or services, to the extent appropriate to the medium and to the goods or services;</p> <p>(b) the identity of the trader, such as his trading name, the geographical address at which he is established and his telephone number;</p> <p>(c) the total price of the goods or services inclusive of taxes, or where the nature of the goods or services is such that the price cannot reasonably be calculated in advance, the manner in which the price is to be calculated, as well as, where applicable, all additional freight, delivery or postal charges or, where those charges cannot reasonably be calculated in advance, the fact that such additional charges may be payable;</p> <p>(d) where applicable, the arrangements for payment, delivery, performance, the time by which the trader undertakes to deliver the goods or to perform the service, and the trader's complaint handling policy;</p> <p>(e) in addition to a reminder of the existence of a legal guarantee of conformity for goods, the existence and the conditions of after-sales services and commercial guarantees, where</p>	<p>1. Member States shall ensure that providers make the following information available to the recipient:</p> <p>(a) the name of the provider, his legal status and form, the geographic address at which he is established and details enabling him to be contacted rapidly and communicated with directly and, as the case may be, by electronic means;</p> <p>(b) where the provider is registered in a trade or other similar public register, the name of that register and the provider's registration number, or equivalent means of identification in that register;</p> <p>(c) where the activity is subject to an authorisation scheme, the particulars of the relevant competent authority or the single point of contact;</p> <p>(d) where the provider exercises an activity which is subject to VAT, the identification number referred to in Article 22(1) of Sixth Council Directive 77/388/EEC of 17 May 1977 on the harmonisation of the laws of the Member States relating to turnover taxes – Common system of value added tax: uniform basis of assessment;</p> <p>(e) in the case of the regulated professions, any professional body or similar institution with which the provider is registered, the professional title and the Member State in which that</p>

Article 20 of the Universal Service Directive	Article 5 of the Consumer Rights Directive	Article 22 of the Directive on Services
<p>(c) where an obligation exists under Article 25, the subscriber's options as to whether or not to include his or her personal data in a directory, and the data concerned;</p> <p>(d) details of prices and tariffs, the means by which up-to-date information on all applicable tariffs and maintenance charges may be obtained, payment methods offered and any differences in costs due to payment method;</p> <p>(e) the duration of the contract and the conditions for renewal and termination of services and of the contract, including:</p> <ul style="list-style-type: none"> — any minimum usage or duration required to benefit from promotional terms, — any charges related to portability of numbers and other identifiers, — any charges due on termination of the contract, including any cost recovery with respect to terminal equipment, <p>(f) any compensation and the refund arrangements which apply if contracted service quality levels are not met;</p> <p>(g) the means of initiating procedures for the settlement of disputes in accordance with Article 34;</p> <p>(h) the type of action that might be taken by the undertaking in reaction to security or integrity incidents or threats and vulnerabilities.</p>	<p>applicable;</p> <p>(f)the duration of the contract, where applicable, or, if the contract is of indeterminate duration or is to be extended automatically, the conditions for terminating the contract;</p> <p>(g)where applicable, the functionality, including applicable technical protection measures, of digital content;</p> <p>(h)where applicable, any relevant interoperability of digital content with hardware and software that the trader is aware of or can reasonably be expected to have been aware of.</p>	<p>title has been granted;</p> <p>(f)the general conditions and clauses, if any, used by the provider;</p> <p>(g)the existence of contractual clauses, if any, used by the provider concerning the law applicable to the contract and/or the competent courts;</p> <p>(h)the existence of an after-sales guarantee, if any, not imposed by law;</p> <p>(i)the price of the service, where a price is pre-determined by the provider for a given type of service;</p> <p>(j)the main features of the service, if not already apparent from the context;</p> <p>(k)the insurance or guarantees referred to in Article 23(1), and in particular the contact details of the insurer or guarantor and the territorial coverage.</p>

One could therefore consider that such provisions are redundant and could be removed.

At the same time, account must be taken of the following considerations:

- The lists of information are different: Article 20 USD provides additional details on information to be given to the end-user, with regards to the features of the services or the duration of the agreement in comparison to the requirements under the CRD. However, Article 5 CRD constitutes a minimum harmonisation

so that national consumer protection law could maintain the level of detail imposed under Article 20 USD.

- The scope of each provision is different. Article 20 USD also applies to professional end-users, while Article 5 CRD is limited to B2C relationships. It does not cover tailor-made offers for the professional end-users. Furthermore, as already stated, the Directive on Services is not applicable to electronic communication services. However, it could be decided to extend the scope of some provisions (for instance Article 22) to electronic communications services.
- The moment when information duties are prescribed and the formal requirements applicable to such information could also be different. Article 20 USD is applicable “when subscribing the contract” (Article 21 also prescribes transparency requirements at other moments), whereas Article 5 CRD must be observed “before the consumer is bound by a contract” and Article 22 of the Directive on Services “before the conclusion of the contract (or before the service is provided if no written contract)”.

Reference should also be made to the provisions of the Unfair Commercial Practices Directive, also applicable to publicly available ECS and that prohibits misleading omissions (Article 7), when USD provides a list of information to be provided to the end-user (Article 20). Purposes are similar in both cases. Protection measures are however different. Protection rules are indeed expressed positively in USD (information must be *provided*, for instance), negatively in UCPD or UCTD (misleading information is *prohibited*, for instance). This potential redundancy could be stressed in order to ask for the removal of the sector specific provisions. It must however be taken into account that the scope is different (UCPD is only applicable to B2C relationship) and that penalties could also be different in national Law (with distinct enforcement by national case law).

Stakeholder views

In respect to contract terms and provision of obliged information, service providers frequently took the view that sector-specific rules can be withdrawn as the horizontal Consumer Rights Directive overlaps and protects residential end-user sufficiently. However, one operator also mentioned that the overlap is not a big burden as the organisation of the service provider already implements the necessary compliance monitoring in any case.

However, NRAs and end-user associations mentioned a number of aspects regarding contract terms and related obliged provision of information which are not covered by horizontal law, but still have relevance and hence could be maintained in the sector specific rules.

- Horizontal rights do not cover business end-users. Especially small and medium businesses could still need sector-specific protection.

- Depending on national law, specific (telecom) details of consumer issues might need to be captured in order to bring service providers to court (e.g. Ireland for issues regarding premium rates numbers).
- Minimum harmonisation has given Member States the flexibility to implement more detailed protection measures where required which served end-users well.

For smaller business end-users however, it seems that sector specific rules are still required as they are not covered by the Consumer Rights Directive and stakeholders have described overcharging issues during migration periods after contract termination and extended contract duration when additional services were added to the original contract.

2.5.5.3 Contract duration, termination and switching (Article 20(2), 30(5) and 30(6) USD)

The provisions of the USD granting rights to end-users (and, especially, to consumers), are grounded on the assumed weakness of the end-user in the field of electronic communications (mainly the lack of information before and until the conclusion of the agreement and the possible abuses of the provider, in the context of contract termination or switching). Various protection measures are therefore enacted to ensure a (more) balanced contract relationship.

Unfair Commercial Practices Directive (UCPD) and Unfair Contract Terms Directive (UCTD) also prescribe protection measures that aim at protecting consumers from the lack of information and the possible abuses from the other (professional) contract party.

- The Unfair Commercial Practices Directive (UCPD):
 - The UCPD prohibits misleading omissions (Article 7), while the USD provides a list of information to be provided to the end-user (Article 20).
 - The UCPD prohibits aggressive commercial practices where, in order to assess coercion or undue influence, account shall be taken of “any onerous or disproportionate non-contractual barriers imposed by the trader where a consumer wishes to exercise rights under the contract, including rights to terminate a contract or to switch to another product or another trader” (Article 8 and 9, d), when USD provides rules on contract duration, termination and switching (Article 20(2), 30(5) and 30(6) of USD).
- Unfair Contract Terms Directive (or UCTD, mainly the Annex, with prohibited list of terms) and the USD :

- The Annex of the UCTD prohibits terms (h) “automatically extending a contract of fixed duration where the consumer does not indicate otherwise, when the deadline fixed for the consumer to express this desire not to extend the contract is unreasonably early”, where USD provides rules on contract duration and termination (Article 30(5)).
- The Annex of the UCTD prohibits terms (k) “enabling the seller or supplier to alter unilaterally without a valid reason any characteristics of the product or service to be provided” or (m) “giving the seller or supplier the right to determine whether the goods or services are in conformity with the contract, or giving him the exclusive right to interpret any term of the contract”, where USD provides rules on the quality of the service (Article 22).

The protection measures listed above fulfil the same purposes (assuming with the same effectiveness) and they could therefore be considered as functionally equivalent. The provisions concerned of Article 20(2), 30(5) and 30(6) of USD could be considered as redundant and an option could consist in repealing these rules. It must however be noted that both horizontal directives concern only the consumers and not all end-users. In addition, penalties in case of violation could be different (depending on the penalties implemented in each Member State, and their enforcement by competent authorities) and this will strengthen the risk of conflicting decisions of the NRAs and general consumer protection authorities.

Stakeholder views

Most consumer and end-user associations said that the current provisions on switching are specific for telecommunication services and hence should not be replaced by horizontal rules. The implementation flexibility provided by the minimum harmonisation of the current sector specific provisions plays a role as switching provisions and especially number portability relate to procedures and technical systems, which can differ significantly between Member States.

2.5.5.4 Out-of-court dispute resolution (Article 34 USD)

Table 45 compares out-of-court dispute resolution under the Universal Service Directive and the Directive on Consumer Alternative Dispute Resolution.

Table 45: Out-of-court dispute resolution under Universal Service Directive and Directive on Consumer ADR

Article 34 USD	Directive on Consumer ADR
<ol style="list-style-type: none"> 1. Member States shall ensure that transparent, non-discriminatory, simple and inexpensive out-of-court procedures are available for dealing with unresolved disputes between consumers and undertakings providing electronic communications networks and/or services arising under this Directive and relating to the contractual conditions and/or performance of contracts concerning the supply of those networks and/or services. Member States shall adopt measures to ensure that such procedures enable disputes to be settled <u>fairly and promptly</u> and may, where warranted, adopt a system of reimbursement and/or compensation. Such procedures shall enable disputes to be settled <u>impartially</u> and <u>shall not deprive the consumer of the legal protection afforded by national law</u>. Member States may extend these obligations to cover disputes involving other end-users. 2. Member States shall ensure that their legislation does not hamper the establishment of complaints offices and the provision of on-line services at the appropriate territorial level to <u>facilitate access</u> to dispute resolution by <u>consumers</u> and end-users. 3. Where such disputes involve parties in different Member States, Member States shall coordinate their efforts with a view to bringing about a resolution of the dispute 4. This Article is without prejudice to national court procedures 	<p>Article 2(3) : “This Directive establishes harmonised quality requirements for ADR entities and ADR procedures in order to ensure that, after its implementation, consumers have access to <u>high-quality, transparent, effective and fair out-of-court redress mechanisms</u> no matter where they reside in the Union. Member States may maintain or introduce rules that go beyond those laid down by this Directive, in order to ensure a higher level of consumer protection”.</p> <p>Article 5. <u>Access to ADR entities and ADR procedures</u></p> <p>Article 6. <u>Expertise, independence and impartiality</u></p> <p>Article 7. <u>Transparency</u></p> <p>Article 8. <u>Effectiveness</u></p> <p>Article 9. <u>Fairness</u></p> <p>Article 10. <u>Liberty</u></p> <p>Article 11. <u>Legality</u></p> <p>Article 12. Effect of ADR procedures on limitation and prescription periods</p> <p>Articles 13 and ff. : Information and cooperation</p>

This table shows that, when comparing Article 34 USD and the provisions of the ADR Directive, the main principles prescribed by Article 34 are at least consecrated by the ADR Directive (which, furthermore, prescribes additional details on this point).

The Directive on Consumer ADR applies to cross-border and domestic out-of-court resolution procedure resulting from sales or service contracts between a trader and a consumer. Notwithstanding the ADR Directive, the Member States remain free to maintain or introduce similar duties to the benefit of professionals. Article 34 is applicable to disputes between providers and consumers, it being agreed that Member States may extend these obligations to cover disputes involving other end-users.

As a result, a possible repeal of Article 34 should normally not give rise to a lower protection for the consumers or professional end-users (being agreed that, in any case, the provisions of the ADR Directive shall prevail on Article 34 USD).

Stakeholder views

Stakeholders in all categories of respondents noted the significant overlap between the sector-specific alternative dispute resolution process and the processes under the Alternative Dispute Resolution Directive and the Online Dispute Resolution Regulation. In this regard, it was also noted in the interviews that there could be different outcomes in the processes under the sector-specific and the horizontal rules.

Furthermore, the stakeholders noted that a single alternative dispute resolution process for all services would be much clearer to end-users, and that the sector-specific process is no longer needed.

However, end-user associations pointed out that the sector-specific alternative dispute resolution process works well and noted that the Alternative Dispute Resolution Directive and the Online Dispute Resolution Regulation cannot be judged yet as they are only recently transposed.

With regard to business end-users, user associations said in the interviews that an alternative dispute resolution process and the option of going to the court is often not used as telecommunication services are too important for their business.

Finally, in the Commission's consultation, 44% of respondents agreed that the enforcement of sector-specific end-user rights should be with the independent sector regulator for electronic communications services, however 34% disagreed. Agreement and disagreement is distributed over the various categories of respondents.

The majority of respondents (61%) and mainly electronic communications service providers, took the view that other national authorities should *not* also be responsible for the enforcement of end-user rights in the electronic communications sector.

2.5.6 Institutional aspects - Out-of-court dispute resolution

Article 34 of the Universal Service Directive obliges the Member States to ensure transparent, non-discriminatory and inexpensive out-of-court procedures for dealing with disputes between consumers and electronic communications network or service providers, for example as regards contractual conditions and performance of contracts. However, the consumer is still entitled to the legal protection offered by national law.

The case law²⁹⁰ has specified that Member States may make the admissibility of lodging a court procedure dependent on having first attempted to settle the dispute out of Court.

In the comments in the public consultation one network operator advocated the removal of Article 34 as the same requirement is addressed within the “*Directive on consumer Alternative Dispute Resolution (ADR) and the Regulation on consumer Online Dispute Resolution, which requires Member States to ensure that ADR, provided by a certified ADR body, is available for any dispute concerning contractual obligations between a consumer and a business*”.

Article 34 indeed does not provide any added value over Article 5 of the ‘horizontal’ ADR Directive that requires Member States to ensure that disputes concerning contractual obligations stemming from sales contracts or service contracts which involve a trader established on their respective territories can be submitted to an alternative dispute resolution entity. This provision provides a sufficient legal basis to oblige Member States to maintain the dispute resolution entities put in place under the Universal Directive as well as the procedural rules and guarantees implemented.

Very diverse institutional solutions are implemented throughout the EU. Most Member States entrusted the NRA with the task to handle disputes (Austria, Bulgaria, Hungary, Cyprus, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Romania, Slovenia). Others created specific entities independent of the NRA (Belgium, Denmark, France, Sweden). In Spain, the Office for telecommunications users of the Secretary General for Telecommunications (SETSI) handles disputes, while in Malta, the ‘converged’ regulator handles disputes.²⁹¹ Finally, some Member States entrusted the task to ‘horizontal’ consumer protection boards that are competent for all industry sectors (Estonia, Finland, The Netherlands,²⁹² Portugal, UK). In some Member States, consumers can submit disputes to any of several different bodies (Greece, Hungary, Italy, Latvia, Malta, Spain, Sweden); however, a certain division of tasks is generally visible. For example, the Hungarian NRA handles end-user complaints in regard to QoS and pricing, while the (horizontal) National Consumer Protection Authority (NFH) and the Chambers of commerce and industry conciliation bodies retain their competence to deal with the eCommunications industry as they do with other industries. In Sweden, there are different entities for dealing with different complaints (general telecom disputes, premium rate services, direct marketing, general consumer disputes, general consumer court cases).

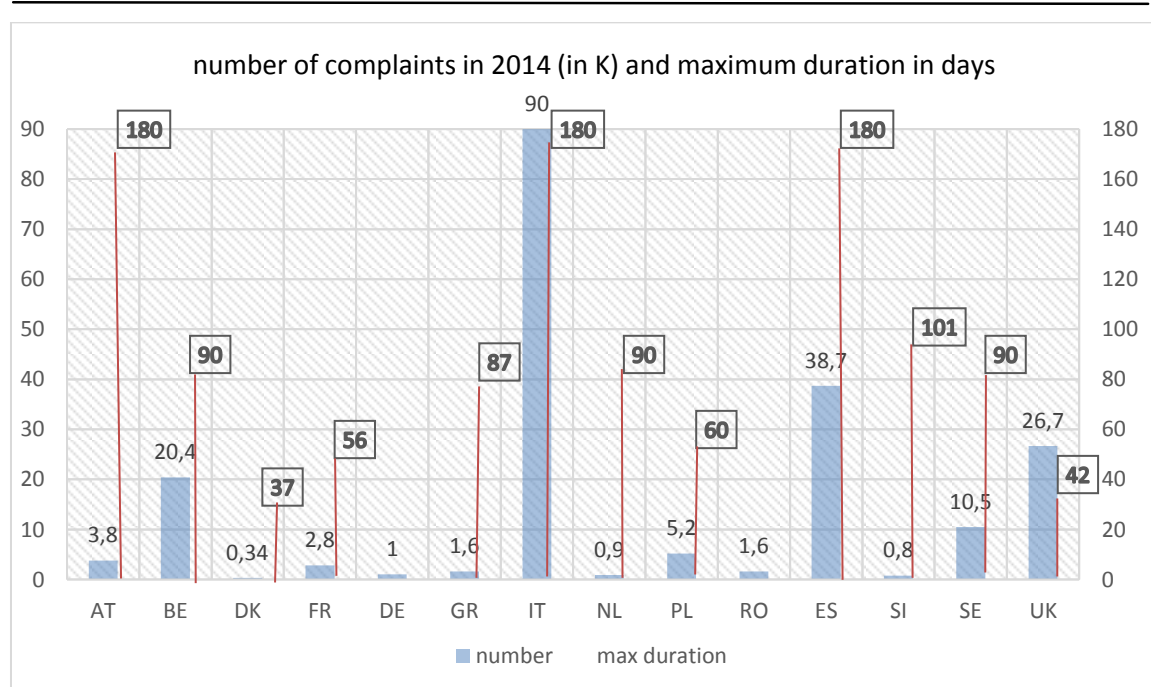
²⁹⁰ Joined Cases C-317/08, C-318/08, C-319/08 and C-320/08, *Rosalba Alassini v. Telecom Italia* (C-317/08), *Filomena Califano v. Wind* (C-318/08), *Lucia Anna Giorgia Iacono v. Telecom Italia* (C-319/08) and *Multiservice v Telecom Italia* (C-320/08), ECLI:EU:C:2010:146.

²⁹¹ Malta Competition and Consumer Affairs Authority (MCCAA).

²⁹² In the Netherlands, the ‘converged’ NRA-consumer protection authority (NMA) provides information to consumers on their rights, but does not handle disputes.

Article 34 of the Universal Service Directive only requires “Member States to adopt measures to ensure that such procedures enable disputes to be settled fairly and promptly”. Under Article 8(e) of the ADR Directive, “...the outcome of the ADR procedure is made available within a period of 90 calendar days from the date on which the ADR entity has received the complete complaint file. In the case of highly complex disputes, the ADR entity in charge may, at its own discretion, extend the 90 calendar days’ time period. The parties shall be informed of any extension of that period and of the expected length of time that will be needed for the conclusion of the dispute”. Statistical information as displayed in Figure 50 below shows that most Member States achieve the maximum duration obligation of 180 days of the ADR Directive, with the exception of Finland, where the procedure can last up to 14 months.²⁹³

Figure 50: Number of complaints and maximum duration in days, selected EU Member States, 2014



Source: <http://www.kuluttajariita.fi/en/index/kuluttajariitalautakunta.html>

Both Article 34 Universal Service Directive²⁹⁴ and the ADR Directive respect the national administrative and procedural autonomy of the Member States, and thus the subsidiarity principle enshrined in the Article 5 of the Treaty on European Union (TEU). The Directives therefore leave a broad margin to the Member States as to the legal

²⁹³ See: <http://www.kuluttajariita.fi/en/index/kuluttajariitalautakunta.html>

²⁹⁴ Member States “may, where warranted, adopt a system of reimbursement and/or compensation”

outcome of the dispute resolution procedure, in particular on whether the procedure should lead to a binding decision.²⁹⁵

The situation varies greatly between Member States. In most Member States, only courts can grant compensation. Dispute resolution bodies have no power to adopt binding decisions (Austria, Belgium, Bulgaria, France, Germany, Ireland, Latvia, Luxembourg, Poland, Portugal, Romania, Slovakia, Spain, Sweden). The picture is not black and white, however. For example, in Sweden, the National Board for Consumer Complaints may only issue non-binding recommendations, but in practice most operators follow its recommendations (including on compensation). In Austria, the NRA likewise has no power to adopt binding decisions in the framework of consumer dispute settlement procedures, but can suggest compensation based on general civil law rules. In other Member States, dispute settlement procedures can lead to binding decisions. In Italy, the NRA has the power grant compensation²⁹⁶ in dispute resolution procedures. In 2014, total compensation amounted to about € 1m. In the Netherlands, the Complaint boards²⁹⁷ can take binding decisions (including on compensation), while in the UK, the Ombudsman services can award up to £ 10.000 (€ 11.780 as of the end of November 2016) compensation for financial loss and inconvenience caused.

2.5.7 The performance of key RFEC provisions relating to end-user issues

2.5.7.1 Effectiveness

2.5.7.1.1 Promotion of end-user interest

The sector-specific provisions at national level have served the end-user interest as is demonstrated by the following outcomes (see Section 2.5.4):

- First, as shown by consumer surveys, the majority of European consumers say that the contract signed provided a high degree of information on the contract duration and renewal or roll-over conditions, the quality of the services subscribed to, and the termination, including early termination charges. This suggests that consumers, as required by Article 20 USD, have access to relatively complete contracts.

²⁹⁵ Art. 7(1)(n) ADR Directive, “the legal effect of the outcome of the ADR procedure, including the penalties for non compliance in the case of a decision having binding effect on the parties, if applicable”.

²⁹⁶ Art. 19 AGCOM Regulation on Dispute Resolution,. See Agcom (2015), AGCOM Annual Report, p. 36.

²⁹⁷ Each board consists of a lawyer and representatives of the Dutch Consumer Association and a trade association. The complaints boards for various industries are grouped in the association of consumer complaint boards. The boards are private bodies, recognised by the Minister of justice (Article 12(1) of the Telecoms Law (Wet van 19 oktober 1998, houdende regels inzake de telecommunicatie (Telecommunicatiewet), <http://wetten.overheid.nl/BWBR0009950/2016-07-01>)).

- Second, the majority of European consumers say that they can easily compare the current electronic communication services subscribed to with other offers. This applies notably to bundles, which account for an increasing share of contracts. This shows that market transparency is relatively high and that the relevant provisions (notably Article 20-21 USD), as a whole, have served their purpose in this regard.
- Third, the sector-specific provisions (Article 30 USD) have generally facilitated switching. While switching is not an objective per se, relevant numbers of customers have switched between providers of electronic communications services in the past. This has allowed end-users to move to better and/or cheaper services and has stimulated competition.

While the level of end-user satisfaction is high on average, there are Member States which appear to lag behind. Member States apply varying combinations of measures, often beyond what is required by the minimum harmonisation level prescribed by the Universal Service Directive. In our cross-country analysis (see Section 2.5.4), we could however not establish a clear linkage between the combination of sector-specific rules imposed in Member States and the level of consumer outcomes.

The analysis (in Section 2.5.4) also shows that, even in Member States with a high degree of end-user satisfaction on average, there is a relevant minority of end-users who say that they are not sufficiently informed about contract terms, who believe that ease of comparability of offers is low, or who never switched in the past. From an end-user rights point of view, these end-user groups continue to merit particular attention. This also suggests that the current degree of sector-specific consumer protection should be maintained.

However, it appears that there are a few areas where gaps exist:

- *Bundling*: Bundling of services, while generally not having a negative effect on contracts, ease of comparability and switching rates (according to consumer surveys), increases complexity for end-users. This is particularly the case if electronic communications services are combined in a bundle with television broadcasting and subscription OTT services, which are subject to different rules. Rules differ with regard to contract duration and termination on the one hand and switching processes on the other hand. Stakeholders noted the following aspects in respect to bundles: (1) End-users should be able to terminate individual services within the bundle. (2) Terminal equipment linked to one service should not be used to lock-in end-users to the other services in the bundle. (3) Renewal of one service in the bundle should not require renewing the contract for the entire bundle. The share of bundles with broadcasting and subscription OTT services will further increase in future, which will make the problem of different rules increasingly pertinent.

- *Early termination*: Rules for early termination must strike a balance between the interest of end-users to end a contract and the interest of providers to recover any initial one-off costs such as subsidies for terminal equipment provided to consumers. Rules on early termination have not been universally imposed and Article 30(5)-(6) USD would merit further precision.

2.5.7.1.2 Promotion of single market

Most of the relevant provisions of the Universal Service Directive are based on minimum harmonisation. Member States have gone beyond the minimum level in various ways. In fact, consumer protection levels are very specific to each Member State with varying combinations of measures being imposed. From a single market perspective, this has led to a certain degree of fragmentation. While the level of consumer protection (as measured by completeness of contracts, ease of comparing offers and extent of switching) is generally relatively high in the majority of Member States, the underlying combination of measures differs. The diversity of national approaches may create a barrier to entry for network operators and service providers active in multiple Member States.

2.5.7.2 Efficiency

The current overlap between sector-specific and horizontal rules may create inefficiency as service providers have to fulfil similar rules under partially overlapping legislation, which may create additional compliance costs and may expose them to the risk of multiple penalties for the same behaviour. Also, consumers have to understand both sector-specific and horizontal rules, which may overburden them. Finally, parallel competencies are allocated to NRAs and consumer protection agencies, which create additional administrative costs.

2.5.7.3 Coherence

2.5.7.3.1 Coherence with the horizontal EU consumer protection rules

An overlap between EU directives means that provisions of several directives are applicable to the same situations and prescribe similar protection rules.

The analysis of possible overlaps between the regulatory framework for electronic communications and horizontal consumer protection law highlights that the legal framework is complex and not easy for the providers to apply, with correspondingly higher risk of non-compliance.

When Member States transpose the different directives, they must first check whether such texts include provisions determining how they should be articulated together. The provision could confirm the cumulative application of both texts or establish a priority between them (stating for instance that, in case of conflict or inconsistency, the provisions laid down in text A shall prevail on provisions laid down in text B).

By virtue of Article 1(4) USD, *“The provisions of this Directive concerning end-users’ rights shall apply without prejudice to Community rules on consumer protection, in particular Directives 93/13/EEC and 97/7/EC, and national rules in conformity with Community law”*.

This Article confirms that the provisions prescribed by horizontal consumer protection law remain applicable, should they be applicable together with the Universal Service Directive (which is normally the case). As such, it does not impose any priority between the texts and, therefore, is not very helpful for articulation purposes. It is even less helpful when a circular cross reference is made in another text, such like Recital 11 of the Consumer Rights Directive, stating that *“... this Directive should be without prejudice to Union provisions relating to specific sectors, such as [...] electronic communications”*.

On the other hand, clear priority rules can also be found. This is the case in Article 3 of the ADR Directive which states: *“...save as otherwise set out in this Directive, if any provision of this Directive conflicts with a provision laid down in another Union legal act and relating to out-of-court redress procedures initiated by a consumer against a trader, the provision of this Directive shall prevail”*. Article 34 of the Universal Service Directive also provides principles for out-of-court dispute resolutions. This means that, in case of conflict, the provisions of the ADR Directive prevail over Article 34 of the Universal Service Directive. UCPD also includes a specific provision stating that *“...in case of conflict between the provisions of this Directive and other Community rules regulating specific aspects of unfair commercial practices, the latter shall prevail and apply to those specific aspects”* (see Article 3(4) and Recital 10 UCPD). This means that, *in case of conflict*, the corresponding provision of the *lex specialis* (USD, for instance) prevails on this directive. Should there be no conflict, both legal provisions remain applicable.²⁹⁸

²⁹⁸ On this point, see also Commission Staff Working Document, Guidance on the implementation/Application of Directive 2005/29/EC on unfair commercial practices, SWD(2016) 163, 25.5.2016 pp. 14-15, that stressed with regard to the complementarity between USD and UCPD: “In order to switch to a different telecom provider, a consumer is required by his current provider to fill in a form. However, the form is not accessible on-line and the provider is not replying to the consumer’s emails/phone-calls. This behaviour is not prohibited by Article 30 of the Universal Service Directive, which only provides that, when switching, subscribers may retain their phone number, the porting of numbers shall be carried out quickly and not be overly costly. It can however be assessed under Article 8 and 9(d) UCPD, which qualify disproportionate non-contractual barriers to switching as an aggressive commercial practice”.

Even with that, however, some differences and contradictions cannot be excluded within the Member States as regards the penalties applicable under national horizontal consumer protection and sector-specific consumer protection (that could also be different among the Member States).

Differences will also be more numerous when the regulation is a minimum harmonisation directive (allowing Member States to introduce additional rules to the benefit of the consumer).

2.5.7.3.2 Coherence with competition law

National and EU competition law can also address objectives pursued by the Universal Service Directive, and may complement Article 30(6) USD which requires Member States to ensure that conditions for contract termination do not act as a disincentive against changing service providers. As regards professional end-users, for example, the Spanish NCA considers that clauses in agreements between undertakings at different levels of the value chain ('vertical' agreements) and whose effect is to dissuade contracting parties from switching providers may constitute prohibited acts under Article 101 TFEU (and national competition law).²⁹⁹ Similarly, as regards the clauses applied by the French electricity producer EDF, the French NCA stated « *lorsqu'elles existent, les modalités de sortie anticipée volontaire d'un contrat doivent réunir un certain nombre de conditions pour ne pas avoir pour conséquence pratique de figer les positions commerciales d'un fournisseur. Le client doit être informé, avant la signature du contrat, des conditions mises par le fournisseur à une résiliation avant terme et dans cette éventualité, se voir appliquer une indemnité qui ne soit pas dissuasive* ». The NCA added « *le caractère dissuasif de la clause d'indemnité peut résulter principalement du niveau de la pénalité demandée, mais aussi de l'absence de clarté du mode de calcul de l'indemnité ou des conditions de déclenchement de la clause* ».³⁰⁰

The enforcement of Article 101 TFEU does not require the existence of a dominant undertaking. A cumulative effect of restrictive clauses applied by the various operators may suffice. The Commission Guidelines on Vertical Restraints³⁰¹ states: "*Possible negative effects of vertical restraints are reinforced when several suppliers and their buyers organise their trade in a similar way, leading to so-called cumulative effects*" (point 105). However, a "*... cumulative anticompetitive effect is unlikely to arise as long as less than 50 % of the market is tied*" (point 138). In that sense, competition law enforcement is more proportionate. It does not impose a '*one size fits all*', but is only triggered when sustainability of market entry and end-user choice is threatened.

²⁹⁹ <https://webgate.ec.europa.eu/multisite/ecn-brief/en/content/cnmc-fines-tele%C3%B3nica-m%C3%B3viles>

³⁰⁰ Conseil de la concurrence, Décision Nr 07-MC-01 of 25 April 2007 in case *KalibraXE*, paras. 60 and 61, <http://www.autoritedelaconcurrence.fr/pdf/avis/07mc01.pdf>.

³⁰¹ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:130:0001:0046:EN:PDF>

Competition law remedies could also be applied against long-term contracts when the effect is to lock in customers and prevent market contestability. Obviously, competition law does not say what a reasonable duration is. But where competitors can show that a duration is, for example, without proportion to the acquisition and other costs of the network operator, the NCA could deem the clauses to constitute restrictions by effect. Although the case concerned an abuse of a dominant position, the reasoning of the Court of Justice in its Hoffman-LaRoche judgment could likely be applied *mutatis mutandis* and contractual clauses considered as restrictive when the duration is “*for an indefinite period, either according to the terms thereof or because of the operation of a clause providing for renewal by tacit agreement, and they were clearly designed to establish trading relations for several years*”.³⁰²

2.5.7.4 Relevance

Horizontal rules achieve a similar effect to that of the sector-specific end-user provisions; however, it is not demonstrated the sector-specific end-user provisions have become less relevant. Although the effects may be similar, it must be noted that the level of protection granted by the horizontal provisions is not necessarily the same.

Specification of contract terms (Article 20(1) USD)

Article 20(1) of the Universal Service Directive is overlapped by Article 5 of the Consumer Rights Directive which requires the provision of similar information with regard to the identity of the provider, the description of the services, the price and the duration of the agreement, and by Article 7 of the UCPD, that prohibits misleading information. At the same time, account must be taken of the following:

- First, the lists of information are different. Article 20 USD provides additional details on information to be given to the end-user with regard to the features of the services or the duration of the agreement.
- Second, the moment when information duties are prescribed and the formal requirements applicable to such information can be different. While Article 20 USD is applicable “*when subscribing the contract*”, Article 5 of the CRD must be observed “*before the consumer is bound by a contract*”.
- Third, the scope is different. While Article 20 USD applies to all end-users including business users, Article 5 of the CRD and Article 7 UCPD are limited to consumers.

302 Case 85/76 *Hoffmann-La Roche v. Commission*, ECLI:EU:C:1979:36, para 86.

Contract duration, termination and switching (Article 20(2), 30(5)-(6) USD)

Article 20(2), 30(5)-(6) USD are overlapped by the Unfair Commercial Practices Directive (UCPD) and Unfair Contract Terms Directive (UCTD) as they follow similar purposes. There are however also differences:

- While purposes are similar, protection measures are different. Protection rules are expressed positively in the USD (information must be *provided*, for instance), and negatively in the UCPD or UCTD (misleading information is *prohibited*, for instance).
- Both horizontal Directives concern only the consumers and not all end-users.

Out-of-court dispute resolution (Article 34 USD)

Article 34 USD is overlapped by the provisions of the ADR Directive, which prevails in case of conflict. The Directive on ADR however does only apply to contracts between a trader and a consumer, while Article 34 USD applies to all end-users.

2.5.7.5 EU value added

In the 2015 public consultation on the review, 'Member States noted that in general the regulatory framework for electronic communications had positive effects on the protection of consumer rights regarding traditional electronic communication services (ECS). In particular, provisions related to contracts and those facilitating change of provider (switching) have diminished unfair lock-in practices and ensure a high level of consumer protection'³⁰³. Regulators are unanimously supportive of sector-specific consumer protection rules: "...the protection level in electronic communications services is higher and should not be reduced".³⁰⁴ As BEREC highlights, "...several NRAs have adopted innovative rules targeting a range of ever-changing commercial practices used by operators in different countries, and tailored to the specific needs of their national end-users".³⁰⁵

The provision of the USD in relation to specified contract terms, contract withdrawal, duration and termination, transparency and publication of information continue to provide value added at EU level.

³⁰³ European Commission (2016), Synopsis Report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, Brussels., p. 10.

³⁰⁴ BEREC (2015), "Opinion on the Review of the EU Electronic Communications Regulatory Framework", BoR (15) 206, p.40.

³⁰⁵ *Idem*.

2.5.7.6 Conclusions

The provisions of the Universal Service Directive in relation to specified contract terms (Article 22(1) USD), contract withdrawal, duration and termination (Article 20(2), Article 30(5)-(6) USD), transparency and publication of information (Article 21 USD), quality of service (Article 22 USD) and number portability (Article 30(1)-(4) USD) have worked well. This is demonstrated by a relatively high level of consumer satisfaction with regard to contract information and ease of comparability in surveys and the extent of switching in the past. These provisions should therefore be preserved.

Based on stakeholder views, gaps exist with regard to bundling and early termination, which would justify amendments:

- *Bundling of services* increases complexity for end-users. Rules with regard to contract duration and termination on the one hand and switching processes on the other hand may differ between services in the bundle. Article 30 USD could be extended to address termination and switching in case of bundles.
- Rules on *early termination* have not been universally imposed and would merit further precision in Article 30(5)-(6) USD.

Even though there is a partial overlap of the sector-specific provisions by horizontal consumer protection law, the existing sector-specific provisions continue to be relevant:

- *Specified contract terms, contract withdrawal, duration and termination, transparency and publication of information:* The USD provisions on specified contract terms (Article 22(1) USD), contract withdrawal, duration and termination (Article 20(2), Article 30(5)-(6) USD), and transparency and publication of information (Article 21 USD) are overlapped by Consumer Rights Directive, Unfair Commercial Practices Directive and Unfair Contract Terms Directive. However, the overlap between USD and the horizontal Directives is only partial and does not justify the repeal of the relevant provisions of the USD. First, while the objectives of USD and horizontal Directives are similar, there are multiple differences in the way protection measures are specified. Second, the horizontal Directives are limited to contracts with consumers and do not cover business users. Small and medium business customers should continue to be protected by the USD.
- *Quality of service and number portability:* The provisions of the USD on quality of service (Article 22 USD) and number portability (Article 30(1)-(4) USD) are specific to electronic communications networks and services and there is no specific overlap with horizontal Directives. Regulation of quality of service and number portability should continue to be the competence of sector regulators with specific knowledge.

- *Out-of-court dispute resolution:* The USD provisions on out-of-court dispute resolution (Article 34 USD) are overlapped by the Directive on Consumer ADR. The latter also takes priority over the USD in case of conflicts. Again, the ADR Directive cannot replace the USD provision as it is limited to consumers and does not cover disputes involving business users. There is continued value in providing a dispute resolution mechanism also for small and medium business customers.

2.6 'Must carry' and findability

Freedom of information, diversity of opinion, media pluralism, and cultural diversity are objectives that are largely dealt with in other EU policies. The regulatory framework for electronic communications, however, is directly relevant in one respect: It allows Member States to impose, subject to certain conditions, 'must carry' obligations for radio and television broadcast channels where they are necessary to meet general interest objectives. Moreover, the regulatory framework for electronic communications is without prejudice to the ability of Member States to impose obligations in relation to the presentational aspect of Electronic Programme Guides, e.g. when ensuring the visibility of general interest channels.

The Section is structured as follows:

- Section 2.6.1 summarises the key technological and commercial trends that impact on the transmission and findability of radio and television broadcast channels.
- 2.6.2 sets out the framework provisions regarding 'must carry' of radio and television broadcast channels and regarding Electronic Programme Guides (EPG).
- Section 2.6.3 assesses the implementation of 'must carry' and EPG provisions in a sample of nine Member States.³⁰⁶
- Section 2.6.4 assesses outcomes and problem areas and also includes relevant views from stakeholders made in the Commission consultation or in our own interviews.
- 2.6.5 looks at institutional issues.

³⁰⁶ Information covering a substantially wider set of countries is available in Kevin, D. and A. Schneeberger (2015), Access to TV platforms: must-carry rules, and access to free-DTT, European Audiovisual Observatory for the European Commission, Brussels ([http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+\(Dec.+2015\)/bb229779-3fb2-488d-9c0e-d91e7d94b24d](http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+(Dec.+2015)/bb229779-3fb2-488d-9c0e-d91e7d94b24d)). See also the Appendix 5.4 to our study for a comparative Table.

- Section 2.6.6 provides an analysis of the relevant framework provisions with regard to the REFIT criteria effectiveness, efficiency, coherence, relevance and EU value added. This section also provides the overall conclusions on the relevant framework provisions.

In the following, we focus on television broadcasting, but, where relevant, extend the analysis to radio broadcasting.

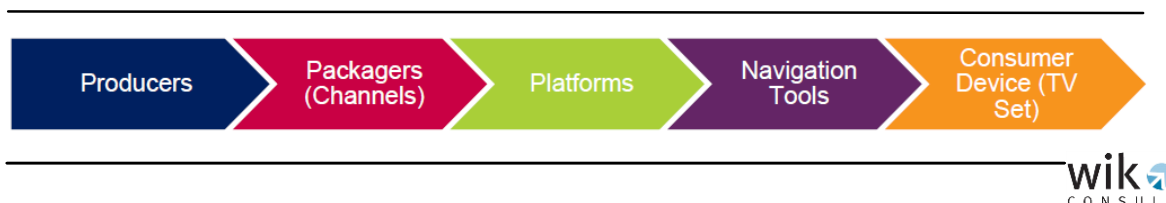
2.6.1 Key technological and commercial developments regarding distribution and findability

2.6.1.1 Traditional television services

Traditional television services – also known as ‘*linear*’³⁰⁷ audiovisual media services – comprise television channels with scheduled programmes. The value chain for traditional linear television services consists of (see Figure 51):

- content production,
- content packaging into television channels (by broadcasters),
- distribution over an electronic communications platform (by a terrestrial, cable, satellite or broadband network operator),
- EPG navigation, and
- viewing by the end-user on a TV set.

Figure 51: Value chain for traditional television and radio services



Source: ERGA (2015), report on material jurisdiction in a converged environment, ERGA 2015 (12), 18 December 2015, p.23.

³⁰⁷ Media Consulting Group (2013), “The Challenges of Connected TV”, Study for the European Parliament, Brussels., p. 12. For the concept of “linear” services, see also Art. 1(1)(e) Audiovisual Media Services Directive,.

Traditional linear TV services have witnessed major changes in the value chain discussed in more detail in the following:

- The migration towards high-definition and prospectively ultra-high-definition television channels (HDTV/UHDTV);
- An expansion in the available transmission capacity on traditional broadcasting platforms; and
- A multiplication in the number of linear TV channels, accompanied by a decrease in viewing time.

2.6.1.1.1 Migration towards high and ultra-high definition channels

Linear channels are increasingly simulcast in high-definition (HDTV). Moreover, *ultra-high-definition (UHDTV)* is currently launched, which multiplies the number of pixels necessary for HD by 4 ("more pixels"). Also, other features such as higher frame rates and a better dynamic range will improve viewing experience ("better pixels"), notably for broadcasting of sport events.

UHDTV channels are already available on satellite³⁰⁸ and on IP networks,³⁰⁹ are expected to be launched on cable within a short timeframe, and on DTT within a longer term perspective.³¹⁰

2.6.1.1.2 Transmission capacity on broadcasting platforms

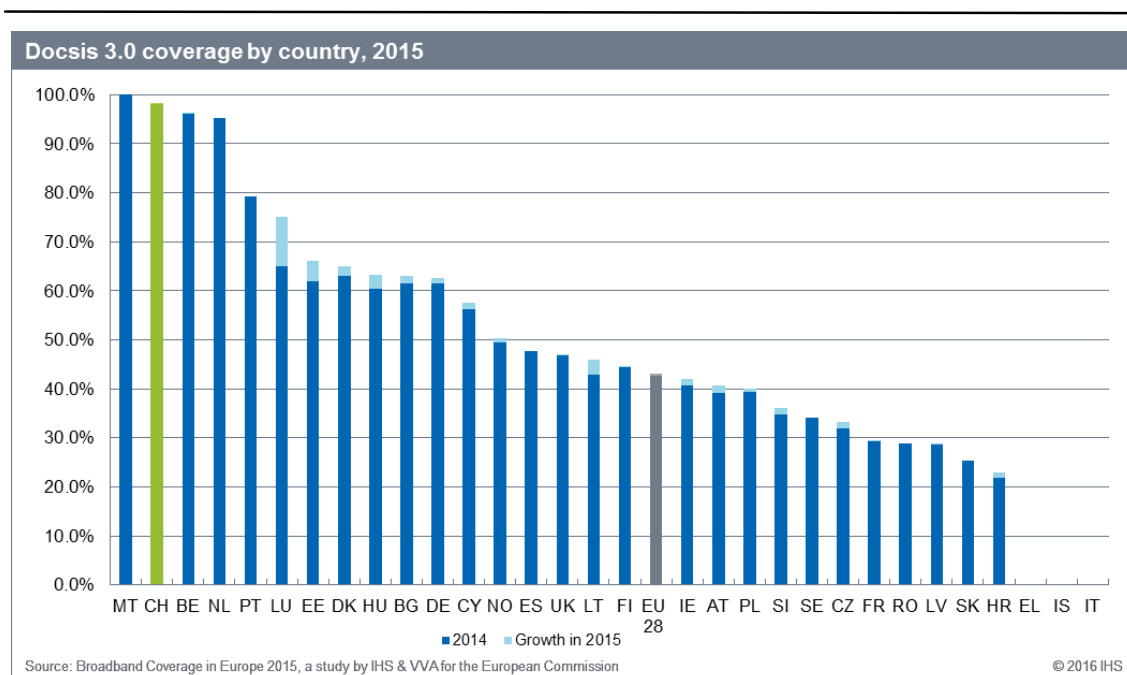
Major technological developments have significantly increased broadcasting transmission capacity. First, traditional broadcasting platforms (terrestrial, cable and satellite) have historically enjoyed wide coverage and availability. Satellite is almost universally available. Cable is also widespread, although not in all Member States, as is shown in Figure 52. Digitisation of traditional broadcasting networks has substantially increased the number of channels that can be transmitted on broadcasting networks.

³⁰⁸ Satellite operators SES, Eutelsat and Hispasat have recently launched UHDTV channels (<http://www.ses.com/ultra-hd> , <http://www.eutelsat.com/en/services/broadcast/ultra-hd-channels.html> , <http://www.hispasat.com/en/products-and-solutions/audiovisual-market/ultra-high-definition>). For a list of UHDTV channels already available on satellite see <http://en.kingofsat.net/ultrahd.php> .

³⁰⁹ Incumbent telecom operators start to offer UHDTV channels on their IPTV networks, e.g. BT (<https://www.productsandservices.bt.com/products/ultra-hd/>)

³¹⁰ See Analysys Mason (2015), "New service developments in the broadcast sector and their implications for network infrastructure", Study for Ofcom, 2015, p. 2.

Figure 52: Coverage of DOCSIS 3 cable networks (percentage of households passed), EU, 2015



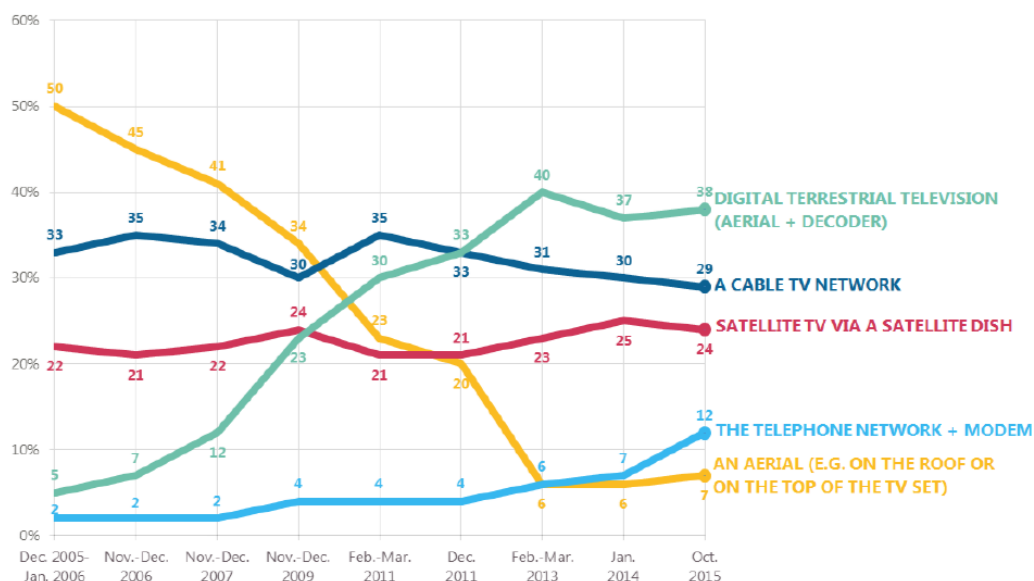
Source: IHS and VVA (2015), Broadband coverage in Europe 2015, Study for the European Commission (taken from IHS Technology, Broadband Coverage in Europe 2015: Coverage in Switzerland, May 2016).
<http://www.glasfasernetz-schweiz.ch/getattachment/2c4f6cf9-e3f4-4944-b988-288aca6abcf9/Broadband-Coverage-in-Switzerland-2015.pdf.aspx>

Second, the roll-out of FTTC/VDSL and FTTB/H networks in combination with multicast technology has made possible operator-managed IPTV platforms and created a fourth broadcasting transmission platform in addition to terrestrial, cable and satellite platforms. While linear TV channels are provided over the managed IPTV platforms, the platform operator's VOD services are provided over the unmanaged IP network in the same way as third party VOD services or access to the public internet.

Digital cable, satellite and IPTV platforms are superior to DTT in terms of the number of channels they can transmit.

As shown in Figure 53, in October 2015, 38% of EU households used digital terrestrial television (DTT), which has witnessed a rapid uptake after its introduction. Use of cable TV (not yet fully digitised in all Member States) has declined slightly to 29%, while satellite TV was relatively stable with a share of 24%. Use of analogue TV (referred to in the figure as "An aerial (e.g. on the roof ...)") has been minimal since 2013. IPTV has increased to 12% of EU households (Figure 53).

Figure 53: Means of receiving television, EU, 2005-2015



Source: Eurobarometer (2016), E-communications and the digital single market, Special Eurobarometer, May 2016, p. 67, <http://www.apdsi.pt/uploads/news/id1002/Eurobar%C3%B3metro%20438.pdf>.

As is also shown by Eurobarometer, the means used to access television widely vary across Member States³¹¹ (see Figure 54):

- In October 2015, DTT was the most common means of access in countries, especially Spain (90% of TV households), Italy (87%) and Croatia (65%).
- Satellite TV was the most common method of television access in six Member States: Ireland (55%), Germany (50%), Slovakia (44%), Austria (43%), Poland (39%) and the UK (36%).
- Digital cable TV was the most common form of access in eight Member States, particularly in Belgium (62%), the Netherlands (54%) and Finland (50%).
- Analogue cable TV was still the most common kind of connection in Romania (54%), and it is also widely used in Latvia (30%) and Hungary (28%).
- IPTV over a broadband network was the most common form of TV access in Slovenia (41%) and Portugal (32%). It was also of high relevance in France (45%).

³¹¹ European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, Brussels, p. 67-68.

Figure 54: Means of receiving television, EU, October 2015

QA2 Does your household receive television via...? (MULTIPLE ANSWERS POSSIBLE) (%)






























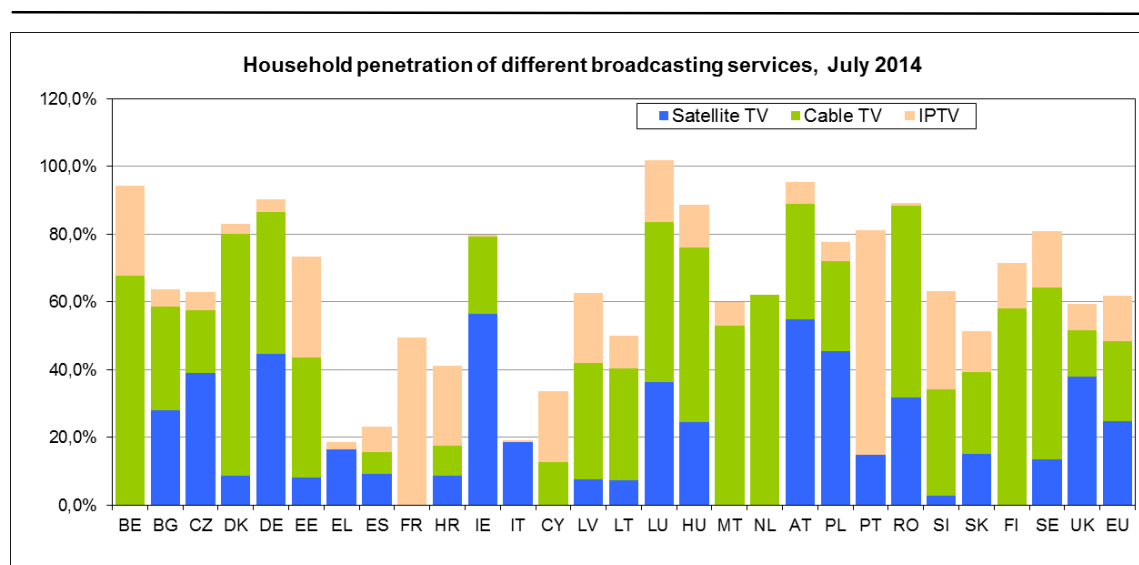
		Digital Terrestrial Television (aerial + decoder)	Satellite TV via a satellite dish + decoder	A cable TV network + decoder (digital TV)	The telephone network + modem and/ or decoder, i.e. ADSL, VDSL or fibre	A cable TV network (analogue = directly connected to the TV set)	An aerial (e.g. on the roof or on the top of the TV set)	Other (SPONTANEOUS)	Don't know	Total 'TV cable'	Total 'Aerial or DTT'
EU28		38	24	20	12	9	7	1	1	29	43
BE		7	4	62	15	17	0	1	0	78	7
BG		11	28	36	3	23	0	0	1	59	11
CZ		60	22	15	4	7	0	0	1	21	60
DK		13	5	48	19	13	0	4	3	60	13
DE		7	50	27	4	15	0	0	1	42	7
EE		23	11	33	26	9	0	2	2	41	23
IE		16	55	15	2	8	13	2	1	23	26
EL		55	5	21	11	6	45	0	0	26	82
ES		90	3	9	10	0	0	0	0	9	90
FR		53	9	9	45	0	0	1	1	9	53
HR		65	7	10	21	0	0	2	2	10	65
IT		87	14	9	6	0	0	1	0	9	87
CY		21	3	9	14	8	67	3	0	17	81
LV		40	11	10	7	30	0	2	2	40	40
LT		21	0	19	13	19	32	0	0	38	51
LU		15	22	32	14	25	0	1	1	56	15
HU		13	20	37	4	28	0	0	0	65	13
MT		34	9	33	4	17	8	7	0	49	42
NL		9	2	54	24	13	0	1	0	66	9
AT		11	43	33	5	13	0	1	3	43	11
PL		24	39	19	2	11	9	0	1	30	33
PT		22	5	29	32	14	0	1	1	41	22
RO		17	8	22	0	54	4	1	0	71	21
SI		5	3	28	41	16	9	1	3	43	14
SK		15	44	16	3	8	17	1	1	24	31
FI		43	3	50	7	0	0	1	2	50	43
SE		29	9	23	19	24	0	2	4	46	29
UK		26	36	12	5	4	34	1	1	16	55
Highest percentage per country		Lowest percentage per country									
Highest percentage per item		Lowest percentage per item									

Figure 55 shows the penetration of cable TV, satellite TV and IPTV, leaving terrestrial television aside which is only capable of transmitting a limited number of channels and which, in many Member States, is used as a complementary means to access TV. In some Member States (Belgium, Luxembourg, and Austria) all or almost all households are connected to at least one of these networks. In France and Portugal, IPTV is on the rise and has already become more important than satellite or cable.

Figure 55: Penetration of cable TV, satellite TV and IPTV (% of households), EU, July 2014



Source: European Commission (http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=9976)

The migration to HDTV and ultimately UHD TV increases bandwidth requirements. The introduction of UHD TV, however, will also be accompanied by the use of new compression and transmission technologies, which - according to Analysys Mason - may over time offset the higher bandwidth requirements:³¹²

- Transmission of UHD TV channels, even using new HEVC compression technology, still requires around four times the capacity of SDTV over MPEG-2 today. Nevertheless, the HEVC standard is likely to become more efficient over the next five years, such that the improvement in compression standards may off-set the demand for increased bandwidth that might otherwise be expected.
- In addition, migration to more advanced transmission technologies, including DVB-T2 for DTT and DVB-S2 for satellite, will enhance the capacity available

³¹² Analysys Mason (2014), New service developments in the broadcast sector and their implications for network infrastructure, Study for Ofcom., p. 2.

using the same amount of spectrum. On DTT, effective capacity will increase by 67%, for satellite by around 30%.

UHDTV will prospectively become available on all networks, though on a different timescale and to a different extent.³¹³ Projections are as follows:

- Satellite networks have sufficient capacity to support UHDTV channels using HEVC compression technology. Migration to more advanced transmission technologies (DVB-S2) will enhance the capacity available further. Analysys Mason expects satellite networks to launch UHDTV for UK viewers from 2016-2017, focusing on channels with exclusive sports rights (e.g. Sky, BT Sport). All European satellite operators (SES, Eutelsat and Hispasat) have recently launched UHDTV channels.³¹⁴
- FTTC/VDSL and FTTH/B networks are able to deliver the required capacity for managed IPTV services, including for UHDTV channels using HEVC compression, multicasting³¹⁵ and caching.³¹⁶ Managed IPTV networks, together with satellite, are the first platforms over which UHDTV has been launched in Europe.
- Cable networks are able to support UHDTV, ideally after switching off MPEG-2 transmission and using HEVC compression technology. Cable networks are likely to support UHDTV to UK viewers from 2018-2019.
- DTT networks will be able to support a limited number of UHDTV channels. Broadcast of UHDTV channels over DTT networks will however require migration to the new DVB standard (DVB-T2) and to new HEVC compression technologies. This will create challenges regarding equipment compatibility. UHDTV is therefore only a longer term prospect.

313 For the following see Analysys Mason (2014), New service developments in the broadcast sector and their implications for network infrastructure, Study for Ofcom, p. 2.

314 For a list of UHDTV channels already available on satellite see <http://en.kingofsat.net/ultrahd.php>

315 Multicasting enables the transmission of a single stream of traffic per channel to multiple viewers in the backbone and back-haul network. Network efficiencies are increased by caching content closer to the end user.

316 Content caching in the home can reduce the volume of content being actively streamed over IP networks.

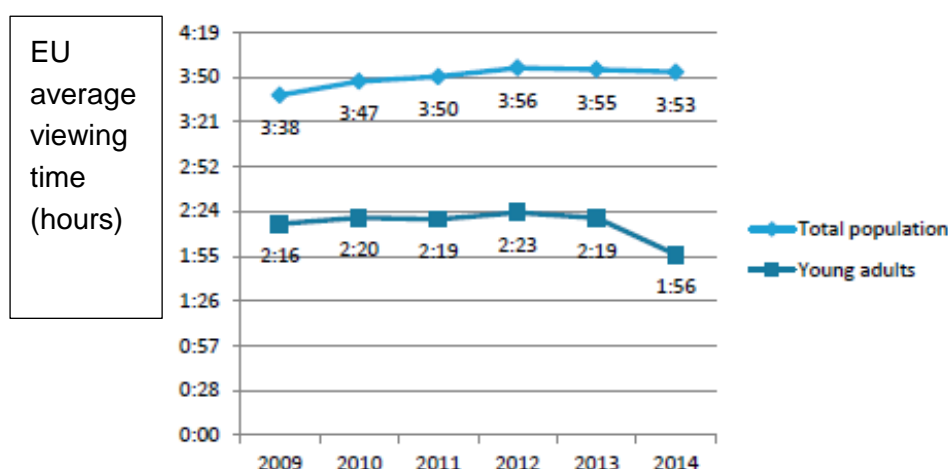
2.6.1.1.3 Number of linear TV channels and viewing time

Over the years, the number of linear TV channels has significantly increased. In 2013, 42% more TV channels were established in the EU than five years earlier. The total number of channels grew from 3615 in 2009 to 5141 in 2013 (excluding local channels).³¹⁷

The growth of channels was made possible by the digitisation of broadcasting networks, which increased capacity. It was pushed by the introduction of high definition on television screens (generally simulcasts of existing channels) as well as the fragmentation of the audiovisual market to cater for individual tastes.³¹⁸

Despite the increase in the number of linear TV channels, TV consumption among EU citizens has slightly decreased since 2012. TV consumption of young people, however, has dropped much more and is significantly lower than it was just a few years ago. In 2014, it was only half as great as that of the overall population (see Figure 56).

Figure 56: EU average television viewing times, total population and young people, 2009-14



Source: European Audiovisual Observatory on the basis of data from Eurodata TV Worldwide (drawn from Agnes Schneeberger (2015), *Origin and availability of television services in the European Union*, European Audiovisual Observatory, November 2015. P. 71)

³¹⁷ Schneeberger, A. (2015), "Origin and availability of television services in the European Union, European Audiovisual Observatory", p. 11.

³¹⁸ *Ibid*, p. 9.

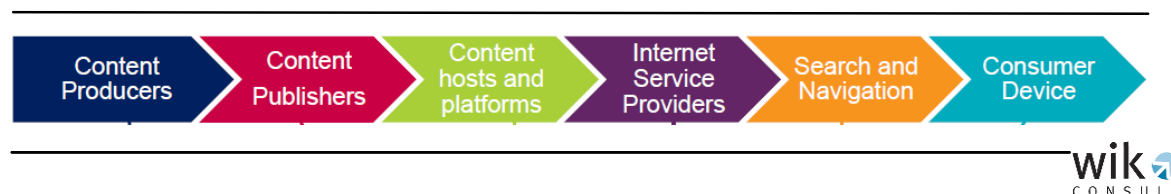
2.6.1.2 Online video services provided 'over the top'

The biggest change to traditional broadcasting comes from the growth of online services provided 'over the top' of the public internet, which compete with traditional linear TV services for the users' media consumption time. Online services may include linear, scheduled streaming services as well as non-linear, on-demand services such as catch-up TV services, other video on-demand services and user generated content.

The emergence of online services has created a radically different value chain for audiovisual media services. The value chain for online services comprises (Figure 57):

- content production,
- content publishing,
- video hosting and platform (open online sharing platforms for user-generated content such as YouTube and DailyMotion),
- internet access,
- search and navigation, and
- viewing by the end-user on a device.

Figure 57: Value chain for online services



Source: ERGA (2015), Report on material jurisdiction in a converged environment, ERGA 2015 (12), 18th December 2015

The value chain for online services has been accompanied by a number of developments directly impacting on traditional linear TV services, including:

- The massive growth of content in linear and non-linear form made available over the public internet;
- The emergence of OTT platforms providing access to broadcasting channels;
- New navigation and search facilities; and
- New consumer devices.

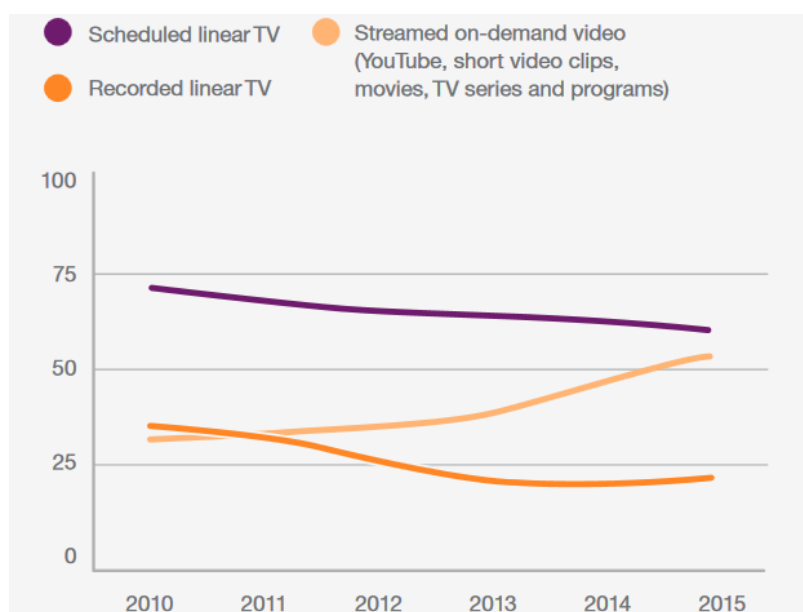
We discuss each of these in turn.

2.6.1.2.1 Growth of linear and non-linear content provided 'over the top'

Most free-to-air linear TV channels have also been made available for live streaming over online platforms. Such TV services are provided over-the-top of a third-party IP network without end-to-end management of broadcasting transmission. In addition, broadcasters complement their offers with non-linear TV (catch-up TV and other video on-demand content).

Usage of on-demand video (YouTube, short video clips, movies, TV series and programs) is steadily rising. According to a survey of viewers in selected European and non-European countries, the percentage of people watching on-demand video rose to more than 50% in 2015 (see Figure 58). In turn, while linear, scheduled TV remained central for many households, because of its access to premium viewing and live content, ease of viewing and social aspects, the percentage of people that watch linear TV at least once a day is steadily declining and has fallen below 60%. At the same time, the share of people that watch recorded TV remained constant since 2013 (see again Figure 58).

Figure 58: Percentage of people watching different media at least once a day, 2010 – 2015



Source: Ericsson, ConsumerLab, TV and Media 2015, An Ericsson Consumer Insight Report, 2015, p. 6.³¹⁹

³¹⁹ Depicted is a three year moving average of use once per day or more, reflecting a base of weekly viewers of video/TV with broadband at home, aged 16-59, in Brazil, China, Germany, Spain, South Korea, Sweden, Taiwan, the UK, and the US. Suitable approximations were made.

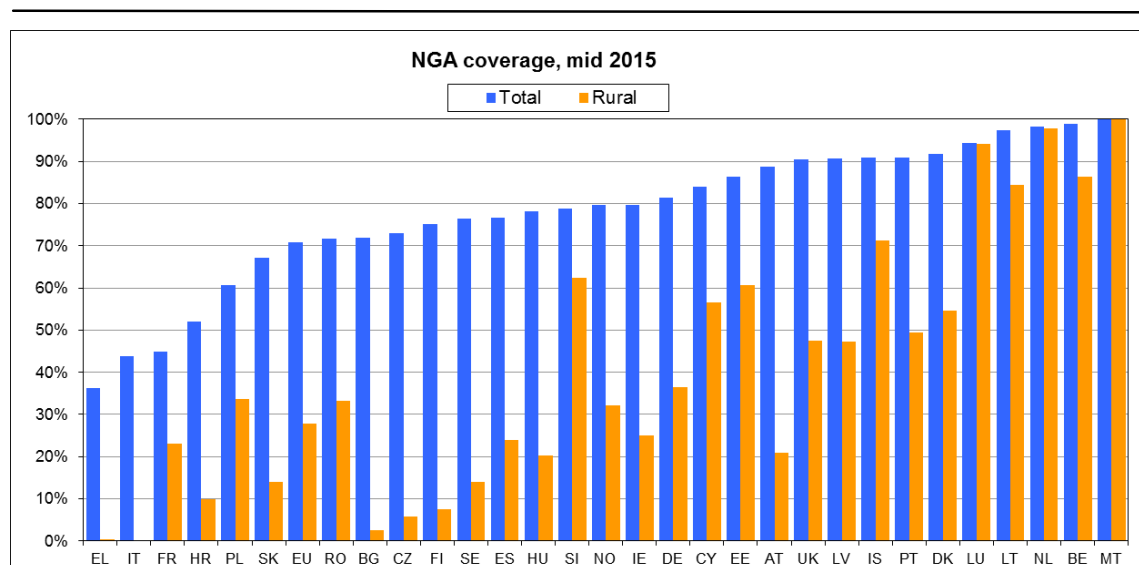
2.6.1.2.2 Emergence of OTT platforms for TV services

Broadcasters and third-party platform providers have made available channels/programmes for online streaming over the public internet. Media players such as the BBC iPlayer (which provides live streaming and catch-up TV) can be directly accessed via a web browser or through a third-party platform. HDTV services have also been made available over IP networks using OTT applications (e.g. YouTube and Netflix in the UK³²⁰).

End-users can use online platforms in addition to a traditional broadcast platform provided they have a fast broadband connection. This development is enabled by the roll-out of NGA networks, the use of multicast and caching (for linear services), the use of CDNs (for catch-up and other video on-demand services)³²¹ and the development of new video coding and compression techniques.

The key enabler is the roll-out of NGA networks. The coverage of NGA technologies (FTTC/VDSL, FTTH/B and Docsis 3.0 cable) stood at 70% in mid-2015. NGA deployments focus on urban areas so far, while only 25% of rural homes were covered (Figure 59).

Figure 59: NGA coverage (homes passed in % of all homes), mid 2015



Note: NGA as defined here includes FTTP, VDSL and Docsis 3.0 cable

Source: European Commission, broadband indicators

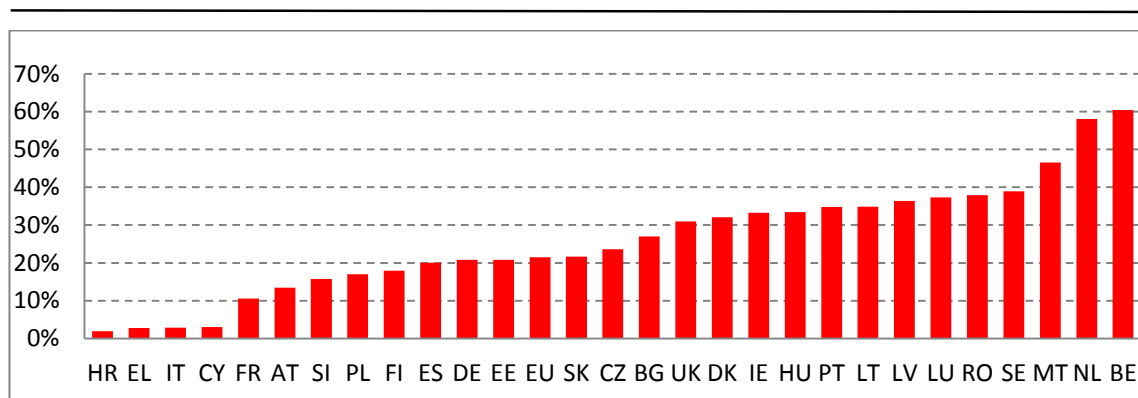
(http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=14329)

³²⁰ Analysys Mason (2014), New service developments in the broadcast sector and their implications for network infrastructure, Study for Ofcom, 2014.

³²¹ Use of CDNs reduces core network transmission and increases the quality of service (lower latency and faster start-up times).

Penetration data suggests that take-up of networks is substantially lagging behind the roll-out achieved. In July 2015, 22% of European households subscribed to a very high-speed fixed connection (30 Mbps and more) (Figure 60).

Figure 60: Penetration with NGA broadband: subscriptions in % of households, July 2015



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Note: NGA as defined here includes subscriptions at speeds of at least 30 Mbps.

Source: European Commission (2016), Europe's Digital Progress Report 2016 – Connectivity (based on Communications Committee).

http://ec.europa.eu/newsroom/dae/document.cfm?action=display&doc_id=15807

2.6.1.2.3 New navigation and search facilities

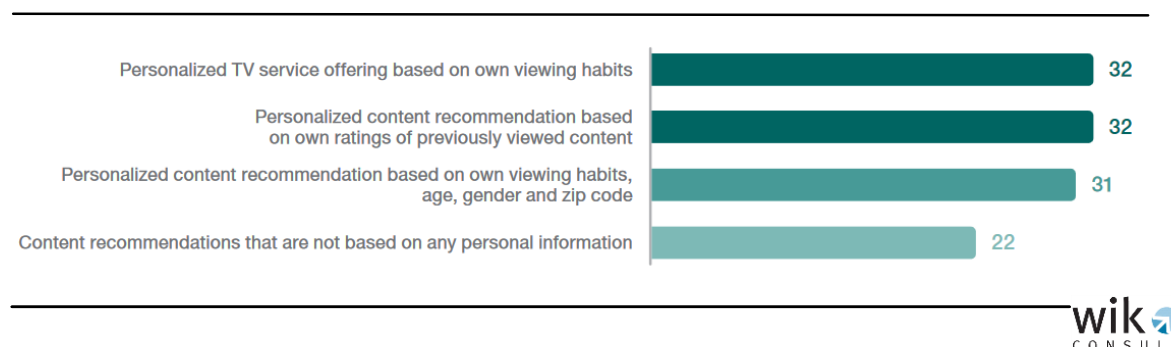
Electronic Programme Guides (EPG) and remote controls are traditional ways to access and select linear broadcasting channels. Interactive program guides (IPG) are a more modern form of the EPG. An IPG enables end-users to navigate programme information menus interactively, using a keypad, computer keyboard or television remote control. Interactive menus are generated on the basis of raw scheduling data sent by broadcasters or centralised scheduling information providers.³²² With the rise of connected TV, which integrates internet features into TV sets ('smart TV'), new user interfaces have emerged. User interfaces may take the form of on-screen menus and pre-installed apps. In the future, with rising smart-TV penetration, smartphones will control television sets. Channel numbers will become less important than logos.

With the growth of non-linear content, search and recommendation facilities become important. Consumers may provide personal data on viewing habits and demography in order to get recommendations. The importance of recommendation features for today's end-users is shown in Figure 61. In a global survey commissioned by Ericsson, 32% of viewers were interested in personalised TV service offerings based on own viewing

³²² https://en.wikipedia.org/wiki/Electronic_program_guide.

habits. The same percentage is interested in personalised content recommendations based on own ratings of previously viewed content.

Figure 61: Percentage of consumers interested in different recommendation features for content and TV services



Source: Ericsson ConsumerLab, TV and Media 2015, An Ericsson Consumer Insight Report, 2015, p. 11.

Base: At least weekly viewers of video/TV with broadband at home, aged 16-59, in 20 markets.

The increased amount of available content as well as the proliferation of recommendation-based choices could prospectively lead to a reduced visibility of public broadcast channels or other specified content.

2.6.1.2.4 Consumer devices

The traditional TV screen loses its role as the unique possibility to access audiovisual content and end-users nowadays can already use a variety of other devices. Possibilities include:

- 'Smart TV' sets with added internet connectivity;
- Set-top boxes which incorporate internet functionality and deliver both linear TV content and non-linear video content through the TV network and over-the-top; and
- Computers, tablets and smartphones streaming audiovisual media services.

Moreover, attention is no longer focused on a single screen. In parallel to watching linear TV channels, viewers could use tablets or smartphones to access additional information about the content watched and to interact with friends or with the TV programme itself through social networks ('second screen').

2.6.2 Key framework provisions regarding ‘must carry’ and EPGs

2.6.2.1 ‘Must carry’

In accordance with Article 31(1) of the Universal Service Directive, ‘must carry’ rules may be imposed by Member States in the public interest on providers of electronic communications networks. ‘Must carry’ obligations are indeed one element of the exhaustive list of non-discriminatory, proportionate and transparent conditions which may, according to Article 6(1) of the Authorisation Directive and its Annex A(6), be imposed in the context of the general authorisation for the provision of electronic communications networks and services (see especially Section 2.1.2). Article 31(1) USD covers specified radio and television broadcast channels and complementary services.³²³ Non-linear audiovisual media and non-linear radio broadcasting services are not covered by the Directive.³²⁴ Member States may only impose must carry obligations on network operators where a significant number of end-users use the electronic communication network(s) concerned as their principal means to receive TV and radio broadcast channels.

The Court of Justice acknowledges that imposing ‘must carry’ only in favour of domestic TV channels constitutes discrimination and a restriction on freedom to provide services within the meaning of Article 51 TFEU.³²⁵ However, according to the well-established case-law of the Court, cultural policy may constitute an overriding requirement relating to the general interest which justifies a restriction on the freedom to provide services.³²⁶

The maintenance of the pluralism which that policy seeks to safeguard is connected with freedom of expression, as protected by Article 10 of the European Convention on Human Rights and Fundamental Freedoms, signed at Rome on 4 November 1950. This freedom is one of the fundamental rights guaranteed by the Community legal order.³²⁷

323 ‘Complementary services’ are to be considered by reference to the radio and television broadcast channels as they consist “*particularly*” in “*accessibility services to enable appropriate access for disabled end users*” (Art 31(1), 1st subparagraph USD). According to Citizens’ Rights Directive, rec 48, “complementary services include, but are not limited to, services designed to improve accessibility for end-users with disabilities, such as videotext, subtitling, audio description and sign language.” (Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 amending Directive 2002/22/EC on universal service and users’ rights relating to electronic communications networks and services, Directive 2002/58/EC concerning the processing of personal data and the protection of privacy in the electronic communications sector and Regulation (EC) No 2006/2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws, [2009] OJ L337/11, *corr.* [2013] OJ L241/9). The concepts of “particularly” and “but are not limited to” leaves room for interpretation, e.g. with regard to differed viewing.

324 ‘Audiovisual media service’, ‘linear audiovisual media service’ and ‘non-linear audiovisual media service’ are defined in Art. (1)(1)(a), (e) and (g) Audiovisual Media Services Directive.

325 Case C-250/06 *United Pan-Europe Communications Belgium and Others v. Etat belge*, EU:C:2007:783, para 38.

326 *Idem* para 41.

327 See Case C-288/89 *Collectieve Antennevoorziening Gouda and Others v. Commissariaat voor de Media*, ECLI:EU:C:1991:323[, para 23; Case C-353/89 *Commission v. Netherlands*, ECLI:EU:C:1991:325, para 30; Case C-148/91 *Veronica Omroep Organisatie v. Commissariaat voor*

On the other hand, the legislation at issue must be necessary in order to attain the cultural policy aim pursued. The case law of the Court of Justice balances the wide margin of discretion of the Member States to determine which measures are necessary with the requirement that the obligations imposed must in no case be disproportionate in relation to that aim and the manner in which they are applied must not bring about discrimination against nationals of other Member States. Discretionary conduct on the part of the national authorities which is liable to negate the effectiveness of provisions of EU law relating to a fundamental freedom is never legitimate.³²⁸ For that reason, Member States must, under the Universal Service Directive, review "must carry" obligations on a regular basis.³²⁹ The case law ³³⁰ specified that:

- The award of 'must carry' status must be subject to a *transparent* procedure based on criteria known by broadcasters in advance, so as to ensure that the discretion vested in the Member States is not exercised arbitrarily. In particular, each broadcaster must be able to determine in advance the nature and scope of the precise conditions to be satisfied and, where relevant, the public service obligations it is required to observe if it is to apply for that status. In that regard, the mere setting out, in the statement of reasons for the national legislation, of declarations of principle and general policy objectives cannot be considered sufficient.
- The award of 'must carry' status must be based on *objective* criteria which are suitable for securing pluralism by allowing, where appropriate, by way of public service obligations, access *inter alia* to national and local news on the territory in question. Thus, such status should not automatically be awarded to all television channels transmitted by a broadcaster, but must be strictly limited to those channels having an overall content which is appropriate for the purpose of attaining such an objective. In addition, the number of channels reserved to private broadcasters having that status must not manifestly exceed what is necessary in order to attain that objective.³³¹

de Media, ECLI:EU:C:1993:45, para 10 and Case C-23/93 *TV10 v. Commissariaat voor de Media*, ECLI:EU:1994:362, para 19.

328 Case C-205/99 *Asociación Profesional de Empresas Navieras de Líneas Regulares (Analir) and Others v. Administración General del Estado*, EU:C:2001:107, para 37, and Case C-390/99, *Canal Satélite Digital v. Administración General del Estado*, and *Distribuidora de Televisión Digital (DTS)*, ECLI:EU:C:2002:34, para 35.

329 Under Art. 31(1) USD the "must carry" obligations must "be reviewed by the Member States at the latest within one year of 25 May 2011 except where Member States have carried out such a review within the previous two years".

330 Case C-250/06 *United Pan-Europe Communications Belgium and Others v. Etat belge*, ECLI:EU:C:2007:783, paras 46, 47 and 48.

331 The Court of Justice, adds in Case C-336/07 *Kabel Deutschland Vertrieb und Service v. Niedersächsische Landesmedienanstalt für privaten Rundfunk*, ECLI:EU:C:2008:765, para 56, that the national judge must also determine whether the obligations imposed on the cable operator are not economically unreasonable.

- The criteria on the basis of which ‘must carry’ status is awarded must be *non-discriminatory*. In particular, the award of that status must not, either in law or in fact, be subject to a requirement of establishment on the national territory.

According to Article 32(2) of the Universal Service Directive, Member States can determine appropriate remuneration in respect to ‘must carry’ obligations. When doing so, they must ensure that, in similar circumstances, there is no discrimination in the treatment of undertakings providing electronic communications networks. Remuneration of the ‘must carry’ operator must also be proportionate and transparent.

2.6.2.2 EPG rules

Under Article 5 of the Access Directive (and its Annex I, Part II (b)), NRAs must be empowered to impose to the extent that is necessary to ensure accessibility for end-users to digital radio and television broadcasting services specified by the Member State, obligations on operators to provide access to application program interfaces (APIs) and to electronic programme guides (EPGs) on reasonable and non-discriminatory terms. NRAs must encourage and where appropriate ensure, adequate access to these facilities.

However, NRAs must comply with the strict requirements set by the Access Directive,³³² namely:

- (i) that mandatory access and interconnection and interoperability of services shall only be ensured where appropriate;
- (ii) that NRAs must exercise their responsibilities and powers in a way that promotes sustainable competition, efficient investment and innovation, and maximises the benefits to end-users; and
- (iii) that such obligations imposed by NRAs shall be objective, transparent, proportionate and non-discriminatory;
- (iv) that NRAs implement such obligations in accordance with the consultation procedures foreseen by Articles 6, 7 and 7a of the Framework Directive.

Under this provision, NRAs can oblige operators to provide access to their Electronic Programme Guide systems to competing broadcasters. OFCOM has, under this provision, required Sky to allow broadcasters and operators of interactive TV services who wish to gain access to viewers using Sky set top boxes and EPG to purchase Sky technical platform services (TPS) on regulated terms.³³³ Such access enables end-users to use a single EPG to access content from several broadcasters.

³³² See European Commission (2004), comments in Case UK/2003/0019: Access control services for digital television, SG-Greffe, D/200167, January 2004, <https://circabc.europa.eu/sd/a/7e656ab7-7738-40d7-8f24-666ee775881d/uk20030019.pdf>.

³³³ OECD, Competition Issues in Television and Broadcasting, 2013, p. 318.

Under Article 6(4) of the Access Directive, Member States may also determine the order of channel listings and other presentational aspects in Electronic Programme Guide (EPG) in TV sets and similar navigation facilities. Usually, TV channels want to appear high up on page of the relevant category list in the EPG.

Article 6(4) is without prejudice to the ability of Member States to “*impose obligations in relation to the presentational aspect of electronic programme guides and similar listing and navigation facilities*” without regard to the market power of the platform concerned.³³⁴ The drafting of the Access Directive reflects the fact that even before its adoption some Member States had already implemented regulation on EPGs, including Italy, Ireland, France, Spain, Germany and the UK.³³⁵

EPGs are nearly ubiquitous in most broadcast media today. EPGs can be made available on television set (or on set-top boxes). Similar functionality is available on mobile phones (particularly through smartphone apps³³⁶), and on the Internet (particularly on websites).

Electronic programme guides can be considered as a special form of content. Their inclusion in the electronic communications framework is somewhat at odds with the principle that the framework does not apply to content.³³⁷ In order to obtain the content concerned, the EPG providers need to obtain the programme grids from the TV channels,³³⁸ which has led to copyright disputes³³⁹ and to issues about how to timely update such information if it changes at short notice.

³³⁴ Access Directive, rec 10 explains: “*Competition rules alone may not be sufficient to ensure cultural diversity and media pluralism in the area of digital television. Directive 95/47/EC provided an initial regulatory framework for the nascent digital television industry which should be maintained, including in particular the obligation to provide conditional access on fair, reasonable and non-discriminatory terms, in order to make sure that a wide variety of programming and services is available. Technological and market developments make it necessary to review these obligations on a regular basis, either by a Member State for its national market or the Commission for the Community, in particular to determine whether there is justification for extending obligations to new gateways, such as electronic programme guides (EPGs) and application program interfaces (APIs), to the extent that is necessary to ensure accessibility for end-users to specified digital broadcasting services. Member States may specify the digital broadcasting services to which access by end-users must be ensured by any legislative, regulatory or administrative means that they deem necessary*”.

³³⁵ Van der Sloot, B. (2012), *Walking a Thin Line: The Regulation of EPGs*, 3, JIPITEC 138, p. 140.

³³⁶ In the Netherlands, an application in the Ziggo footprint allows subscribers to watch up to 50 video channels on their iOS or Android devices in the home, access an electronic program guide and browse through the on-demand library. A patent holder took action against Ziggo, claiming a patent breach in 2012. On 19 December 2012 the Court rejected nevertheless the claims. See Spauwen, J. (2013), *Software Patents in Real Life: the Right to an Electronic Programme Guide*, <http://kvdl.nl/en/news/software-patents-in-real-life-the-right-to-an-electronic-program-guide/>. A similar procedure had been launched in 2008 against Virgin Media. See <http://ipkitten.blogspot.be/2008/01/murdoch-v-branson-in-uk-tv-patent.html>

³³⁷ Framework Directive, rec 5: “*It is necessary to separate the regulation of transmission from the regulation of content. This framework does not therefore cover the content of services delivered over electronic communications networks using electronic communications services, such as broadcasting content, (...)*”.

³³⁸ In its landmark ‘Magill’ judgment (Joined Cases C-241/91 P and C-242/91 P *Radio Telefis Eireann (RTE) (C-241/91 P) and Independent Television Publications (ITP) (C-242/91 P) v. Commission*, ECLI:EU:C:1995:98, the Court of Justice acknowledged that program listings constituted an essential

The current scope of access obligations is limited to EPG services and EPG facilities provided in association with electronic communications networks and services (including specialised services), but not on similar services and facilities provided in association with OTT services.

2.6.3 Implementation of key framework provisions in relation to ‘must carry’ and EPGs

2.6.3.1 ‘Must carry’

‘Must carry’ obligations, in practice, are imposed in a majority of Member States assessed in this study (6 out of 9 Member States). ‘Must carry’ obligations exist in Germany, Finland, France, Netherlands, Poland and Sweden (Table 46).³⁴⁰ The UK Communications Act empowers Ofcom to impose ‘must carry’, but these provisions have not been applied in practice. Similarly to the UK, the Spanish Telecommunication Law provides for the possibility of ‘must carry’ obligations, which are not applied in practice. In Italy, ‘must carry’ obligations can under certain circumstances be imposed on digital terrestrial multiplex platforms, which are however also not applied.

Formal ‘must carry’ obligations are primarily placed on cable and IPTV networks (6 out of 9 Member States). In three Member States, ‘must carry’ is also imposed on satellite platform operators (France, Netherlands and Poland).³⁴¹ In most countries, however, there are no impositions on satellite.³⁴²

facility under Article 102 TFEU. Three television stations (RTE, ITV, and BBC) broadcasting in Ireland and Northern Ireland had refused to license their copyright on the information contained in their respective program listings to the Irish publisher Magill TV Guide Ltd. Magill then briefly attempted to produce its own television guide until the broadcasters invoked their copyrights to seek an injunction. Magill complained to the Commission, which considered the refusal to deal abusive. The Court of Justice upheld the Commission and Court of First Instance decisions to order a compulsory license, drawing on the principle of exceptional circumstances.

339 Matzneller, P. (2012), Unauthorised Use of EPG Programme Information Breaches Copyright Law, IRIS 2012-9, p/12-13

340 A recent study lists further Member States in which ‘must carry’ obligations may be imposed: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Croatia, Hungary, Ireland, Lithuania, Latvia, Malta, Portugal, Romania, Slovenia and Slovak Republic. See Kevin, D. and A. Schneeberger (2015), Access to TV platforms: must-carry rules, and access to free-DTT, European Audiovisual Observatory for the European Commission, pp. 23-26 ([http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+\(Dec.+2015\)/bb229779-3fb2-488d-9c0e-d91e7d94b24d](http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+(Dec.+2015)/bb229779-3fb2-488d-9c0e-d91e7d94b24d)). See also Appendix 5.6.

341 In one Member State not addressed here, Romania, the Competition Council advised that must carry should be applied in line with technological neutrality regardless of the way of retransmission, be it cable or satellite direct-to-home (DTH) and not only to cable operators (see press release Consiliul concurenței recomandă revizuirea principiului „must carry”; January 2014). However the opinion was not followed by the media regulator. See Eugen Cojocariu (2014), New „must carry” List for 2014, IRIS 2014-3:1/39.

342 In the EAO study, platforms which may be subjected to ‘must carry’ also widely vary in the other countries: Austria (cable), Belgium (all platforms), Bulgaria (DTT, cable satellite), Czech Republic (cable), Denmark (DTT/cable/IPTV), Estonia (DTT, cable, IPTV), Croatia (platforms with significant market power), Hungary (all platforms), Ireland (all platforms), Lithuania (all platforms), Latvia (all

‘Must carry’ obligations are usually not imposed for Digital Terrestrial Transmission (DTT). The exception is the Netherlands, where Flemish PSB channels are included in the ‘must carry’ list. Rules relating to assignment of spectrum to DTT operators and broadcasters, however, have a similar effect to that of ‘must carry’. Member States can ensure that Public Service Broadcasting gets access to multiplex capacity (Finland, Italy, and Poland) or assign an entire multiplex to Public Service Broadcasting (Sweden and the UK). Alternatively, if spectrum is given directly to broadcasters instead of network and/or multiplex operators, this also has a similar effect as a ‘must carry’ obligation (Germany and France).

In addition to ‘must carry’ obligations relating to TV channels, several Member States also impose such obligations in favour of public radio channels.³⁴³

platforms), Malta (cable), Portugal (DTT and cable), Romania (cable), Slovenia (all platforms except DTT) and Slovak Republic (cable, IPTV, MMDS). See Kevin, D. and A. Schneeberger (2015), Access to TV platforms: must-carry rules, and access to free-DTT, European Audiovisual Observatory for the European Commission, pp. 23-26 ([http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+\(Dec.+2015\)/bb229779-3fb2-488d-9c0e-d91e7d94b24d](http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+(Dec.+2015)/bb229779-3fb2-488d-9c0e-d91e7d94b24d)). See also Appendix 5.6.

343 For example in the Netherlands, 25 radio channels benefit from ‘must carry’ under the 2008 Media law. In the French speaking part of Belgium, cable operators must broadcast La Première, Vivacité, Classic 21, Pure FM, Musiq3, the Flemish Radio 1 and Radio 2 as well as the German language BRF1 or BRF2.

Table 46: Platforms on which explicit 'must carry' obligations are imposed in practice as of February 2016

	Platforms on which 'must carry' obligations are imposed <u>in practice</u>				Conditions in the law for imposing must carry
	DTT	Cable	IPTV	Satellite	
DE	NA	√	√	-	Up to 1/3 of digital capacity of broadcasting network
ES *	-	-	-	-	-
FI	-	√	√	-	Subject to availability of capacity
FR	NA	√	√	√	Regional programmes of Public Service Broadcasters subject to available capacity; local channels if >3% of households in the relevant geographic area connected
IT *	-	No cable networks	-	-	(If must carry where applied) local channels of digital terrestrial multiplex platforms **
NL	√	√	√	√	>100,000 subscribers, all platforms combined
PL	-	√	√	√	>100,000 subscribers
SE	-	√	√	-	Significant number of households must be connected to network and use it as their principal means to receive TV; >100 homes for carriage of designated local channels
UK *	NA	-	-	-	(If must carry were applied) Significant number of households must be connected to network and use it as their principal means to receive TV

* In Spain and the UK, 'must carry' obligations are provided for in the law, but not imposed in practice. In Italy, the law applies 'must carry' to digital terrestrial multiplex platforms (local channels), but no obligations are imposed in practice.

** In Italy, obligations apply to local DTT operators that: (i) retained their frequencies following the allocation of the 800 MHz for mobile broadband; these operators must offer transmission capacity (for "two programmes" and min. 6 Mbps) to those local broadcasters that have handed the frequencies back to the state; (ii) will be assigned frequencies that are currently not in use (procedure is pending); these operators will be obliged to carry only local channels; (iii) use frequencies that are not causing interference at international level; these operators will be obliged to carry local channels to be chosen by the ministry on the basis of certain criteria. In June 2014, following its analysis aimed to collect elements for a potential introduction of the obligation for operators that own 5 DTT multiplexes to allow access to 40% of transmission capacity of the 5th MUX (as requested by the European Commission to close the pending infringement procedure),

Source: WIK Consult/Cullen International.

The imposition of 'must carry' obligations on broadcasting platforms is to a varying extent subject to conditions in the relevant laws (see Table 46). First, such conditions make the imposition of 'must carry' subject to capacity considerations. In Germany, for example, cable and IPTV platform operators must allocate up to a maximum of one third of their overall capacity for the digital transmission of broadcasting to 'must carry' channels. Finland makes 'must carry' dependent on available capacity: The imposition of a 'must-carry' obligation is subject to (i) the capacity not being used by the network operator's own TV/radio operations or being reserved for its reasonable future needs, and (ii) there being no need to significantly invest in improvements in network capacity

to fulfil the ‘must carry’ obligation. France has a capacity condition with regard to local and regional programmes: Regional PSB channels can be subject to ‘must carry’ obligations except if there are capacity constraints.

Second, Article 31(1) of the Universal Service Directive expressly requires that a ‘must carry’ obligation should only be imposed on networks “if a significant number of end-users of such networks use them as their principal means to receive radio and television broadcast channels”. In the Member States analysed,³⁴⁴ such a condition exists in varying forms:

- In France, local channels can get ‘must carry’ status except where the number of subscribers does not exceed 3% of the households in the relevant geographic area of the local channel or where the reception device’s main function is not the reception of radio and TV services.
- In Germany, the must-carry regulation applies with respect to networks with more than 10.000 homes with a fixed connection and wireless networks with 20.000 connections.³⁴⁵
- In Poland, must carry obligations are imposed only on operators with at least 100.000 subscribers.³⁴⁶
- In the Netherlands, more than 100.000 subscribers should be connected to the platform operator, all platforms combined.
- In Sweden, a condition for the application of must carry is that a significant number of connected households use the network as their principal means of receiving television broadcasts. To be considered as “principal means” also implies that more than a limited number of programme services are transmitted in the network. The providers, however, are not obliged to retransmit to detached houses or other households that have the ability to receive terrestrial broadcasts via their own antenna.

³⁴⁴ The condition also exists in Member States not analysed. For example, in Malta, the analogue cable TV network was still used by 13% (18,200) of households in 2012, which number the MCA considers to be significant. See Malta Communications Authority (MCA), Decision of 23 February 2012, Must-Carry Obligations - Designation of Obligations on Providers of Networks used for Television and Radio Distribution Services, MCA/D/12-0768, p. 10, MCA/D/12-0768 (<https://www.mca.org.mt/sites/default/files/attachments/decisions/2013/must-carry-designations-obligations-MCAD12-0768.pdf>). On the other hand, in Belgium “significant” is interpreted as 25% of the connected households. See Conseil Supérieur de l’Audiovisuel (CSA), Réévaluation de la situation du paysage de la télédistribution en FWB, 27 Novembre 2012 (<http://csa.be/breves/717>).

³⁴⁵ Van Eijck, N. and van der Sloot, B. (2012), “Must-carry Regulation: a Must or a Burden?”, *IRIS plus* 2012/5, p.16.

³⁴⁶ See: <https://www.senat.gov.pl/download/gfx/senat/pl/senatdruki/7735/druk/139.pdf..>

- In the UK, a significant number of households must be connected to the network and use it as their principal means to receive TV ('must carry' is, however, not imposed in practice).

Overall, the 'significance' criterion is interpreted in varying ways, and there is no common approach to assure that 'must carry' obligations are imposed only "if a significant number of end-users of such networks use them as their principal means to receive radio and television broadcast channels".

Channels benefiting from 'must carry' are predominantly domestic national PSB channels. Most countries also extend 'must carry' to regional/local channels. A case apart are the Netherlands and Belgium, where 'must carry' has been extended respectively to two channels of the Flemish PSB in the Netherlands and the Dutch PSB in the Flemish part of Belgium (Table 47). In many Member States, commercial channels also benefit *de lege* from 'must carry' obligations, but sometimes the criteria set are dissuasive.³⁴⁷

347 In Belgium, private broadcasters can also benefit from must-carry if they have concluded with the Government a convention according to which: (i) they showcase the cultural heritage of the French speaking Community; (ii) they offer a minimum daily number of hours of programmes, of which one part must be first runs; (iii) they broadcast at least one daily news and current affairs program; (iv) they invest at least 24% of their revenues in the production of domestic audiovisual works; (v) they employ at least 60 people. No broadcaster has ever used this opportunity. See OSCE (2015), Best practices regarding must-carry and must-offer rules for cable operators and broadcasters for the government of the former Yugoslav republic of Macedonia, May 2015, p. 10.

Table 47: TV Channels benefiting from 'must carry' obligations as of February 2016

	Platforms with 'must carry' obligations imposed in practice	Channels benefitting from 'must carry' in practice
DE	Cable, IPTV	<ul style="list-style-type: none"> National and regional PSB channels, including programme related services (regional windows); Commercial TV services which contain regional windows; Regional and local television services and open access channels licensed in the respective state ("Offene Kanäle" are open to the public to create and distribute their own TV broadcasts)
ES	-	NA
FI	Cable, IPTV	<ul style="list-style-type: none"> PSB channels (YLE) and ancillary services; Nationwide free-to-air commercial channels that contribute to general interest objectives and ancillary services
FR	Cable, IPTV, satellite	<ul style="list-style-type: none"> National and regional PSB; Local channels (not for satellite)
IT	-	NA
NL	Cable, IPTV, satellite, DTT	<ul style="list-style-type: none"> National, regional and local PSB channels; 2 Flemish PSB channels; Up to 2 local PSB channels aimed at minorities
PL	Cable, IPTV, satellite	<ul style="list-style-type: none"> National and regional PSB channels; Legacy channels transmitted on the date of entry into force of the Act of June 30, 2011 on the launch of DTT
SE	Cable, IPTV	<ul style="list-style-type: none"> National PSB channels, incl. regional channels; Designated local channels (only on cable, not on IPTV)
UK	-	NA

Source: WIK Consult/Cullen International.

Some Member States also impose 'must offer' obligations on broadcasters that benefit from a 'must carry' obligation. Among the Member States assessed above, a 'must offer' obligation exists in France (for PSB channels), Poland and Spain. In Italy, there is a 'must offer' obligation for PSB channels, although an explicit 'must carry' obligation does not exist. No 'must offer' obligation has been imposed in Finland and Germany.³⁴⁸

Rules on 'must carry' can also describe who bears the related costs of connecting to the relevant broadcaster and transporting the TV signals. Rules to this effect are included in the relevant laws in 4 out of 9 Member States assessed. In all of these cases, the law states that the 'must carry' operator must bear the cost (Table 48).

³⁴⁸ OSCE (2015), Best practices regarding must-carry and must-offer rules for cable operators and broadcasters for the government of the former Yugoslav republic of Macedonia, p. 6.

Table 48: Rules in law on who bears the cost of 'must carry' as of February 2016

	Platforms with must carry obligations imposed in practice	Rules in law on who bears the cost of must carry
DE	Cable, IPTV	-
ES	-	NA
FI	Cable, IPTV	√ (Must carry provider)
FR	Cable, IPTV, satellite	√ (Must carry provider, except for regional channels)
IT	-	-
NL	Cable, IPTV, satellite, DTT	NA
PL	Cable, IPTV, satellite	√ (Must carry provider)
SE	Cable, IPTV	√ (Must carry provider, except for service/maintenance)
UK	-	NA

Source: WIK Consult/Cullen International.

2.6.3.2 EPG rules

A 'must carry' obligation has little meaning if the user is not aware that a channel with 'must-carry' status exists or if he/she cannot find it. Specific rules on the order of digital television broadcasting channels in Electronic Programme Guides are absent in 6 out of 9 Member States. The lack of such rules reflects the fact that viewers so far have no problems in finding general interest channels, which often are those with the largest audience shares.

Specific rules relating to specified digital television broadcasting content in Electronic Programme Guides are only imposed in Finland, France and the UK (Table 49):

- In Finland, FICORA may impose obligations on all operators regarding access to EPGs in order to ensure that information attached to must-carry channels is provided to the public. In addition, FICORA may issue regulations on the "content and organisation" of the EPG. It has not issued such regulations so far. Accordingly, obligations have not been imposed in practice. An exception is however DTT, where priority is given to channels of PSB (Yle) and to commercial free-to-air channels that contribute to general interest.
- In France, the media regulator CSA has defined for DTT three homogeneous blocs of channels: (i) national free-to-air channels; (ii) local channels; and (iii) pay channels and assigns a number to each channel within its block. Within the block of national free-to-air channels, the numbering is No. 1: TF1, No. 2: France 2, No. 3: France 3, No. 4: Canal Plus, etc. The rationale is the interest of

the public and the equality of treatment between channels of the same categories. Cable, IPTV and satellite platform operators do not have to use the numbers decided by CSA for DTT channels. However, they must set up a thematic block of those channels which are also broadcast on DTT. Within this block the logical ordering set up by the CSA must be respected. Distributors must therefore ensure that (i) PSB channels have sufficient exposure to fulfil their public service mission in the thematic block within which they are listed; (ii) accept requests from free-to-air DTT channels to be presented in their referencing tools on fair, reasonable and non-discriminatory (FRND) terms. CSA has the power to oppose the numbering allocated to PSB channels if this numbering prevents these channels from fulfilling their public service mission.

- In the UK, the regulation of EPGs is prescribed by sections 310 and 311 of the Communications Act (2003). Section 310 enjoins Ofcom “...to draw up, and from time to time to review and revise, a code giving guidance as to the practices to be followed in the provision of electronic programme guides.” Ofcom’s Code of Practice on Electronic Programme Guides sets out the best practice: “*This Code sets out the practices to be followed by EPG providers: (a) to give appropriate prominence for public service channels; (b) to provide the features and information needed to enable EPGs to be used by people with disabilities affecting their sight or hearing or both;*³⁴⁹ *and (c) to secure fair and effective competition.*”

³⁴⁹ OFCOM’s Code states that subtitling and audio description information must be included on EPGs (paragraph 3): “*EPG providers will be required to ensure that information included in relation to television programmes indicates which programmes are accompanied by television access services. A corresponding provision has been included in the Code on Television Access Services requiring broadcasters to make such information available to EPG providers. Where practicable, programme information in the EPG should indicate by means of standard abbreviations the nature of the access service provided. Where applicable, the programme synopsis in the EPG should indicate which programmes are accompanied by television access services, using the following upper-case letters - subtitling (S), signing (SL) and audio description (AD). Where practicable, these abbreviations should be explained in an appropriate part of the EPG. If non-standard terms are used in any part of the EPG, and removal or replacement by the standard abbreviations would require software or hardware updates, this should be done at the next reasonable opportunity*”. In addition to the above requirements, the code of practice includes provisions on the accessibility of online EPGs (paragraph 3): “*EPG providers should provide an easily accessible part of their EPGs (where practicable) or alternatively in other accessible ways (e.g. on websites or interactive services) information for people with disabilities on: how to use the EPG; how to use the access services accompanying the programmes; what options exist for customising the appearance of the EPG to make it easier to use; and what additional sources of help and information are available in other places (e.g. on websites, or from telephone / textphone helplines), whether from the EPG operator, or television service providers*”.

Table 49: EPG rules imposed in practice for specified digital television broadcast content as of February 2016

	Rules on ordering of television broadcasting channels in EPGs imposed in practice?
FI	<ul style="list-style-type: none"> (Only for DTT) Priority is given to channels of PSB (YLE) and to commercial free-to-air channels that contribute to general interest *
FR	<ul style="list-style-type: none"> DTT: CSA has defined homogeneous blocs, i.e. (i) national free-to-air channels; (ii) local channels; and (iii) pay channels, and numbers channels within each block. Within the block of national free-to-air channels, the numbering is No. 1: TF1, No 2: France 2, No. 3: France 3, No. 4: Canal Plus, etc. Cable, IPTV, satellite: Platform operators do not have to use the numbers decided by CSA for DTT channels (see above). However, they must set up a thematic block of DTT channels, within which the logical ordering set up by the CSA must be respected. It must therefore be ensured that PSB channels have sufficient exposure to fulfil their public service mission in the thematic block within which they are listed.
UK	<ul style="list-style-type: none"> EPG providers must give appropriate prominence to public service channels (BBC programmes, Channel 3, Channel 4, Channel 5, S4C Digital, digital public teletext service); Findability of regional channels

* FICORA may impose obligations on operators regarding access to EPGs in order to ensure that information attached to must-carry channels is provided to the public. In addition, FICORA may issue regulations on the “content and organisation” of the EPG. It has not issued such regulations so far.

Source: WIK Consult/Cullen International.

In Germany, the platforms must comply with the principles of equal opportunity and non-discrimination.³⁵⁰ In addition, a Statute³⁵¹ obliges EPG operators to provide equal reference to public and private programmes.

With the exception of Greece (which is not part of the country sample assessed), there are no cases where Member States have regulated EPG access. The Greek NRA has imposed only very generic conditions for access to Application Programming Interfaces (APIs) and Electronic Programme Guides (EPGs), requiring fair, reasonable and non-discriminatory terms.

³⁵⁰ The principles of equal opportunity and non-discrimination imply for EPGs: (i) several lists with different sorting criteria are offered next to each other, (ii) the user has the ability to change the sequence of channels in the list or to create his own favourites list and (iii) a proffered list of favourites is offered without prefixed settings. See Birgit Stark (2008), “Der EPG als Gatekeeper im Digitalen Fernsehen – Risikopotenzial durch neue Marktakteure?” TV 3.0 - Journalistische und politische Herausforderungen des Fernsehens im digitalen Zeitalter. 11. März 2008, Berlin FES Konferenzzentrum, quoted by Van der Sloot, B. (2012), Due Prominence in Electronic Programme Guides, IRIS 2012 – 5, p.36.

³⁵¹ Satzung über die Zugangsfreiheit zu digitalen Diensten und zur Plattformregulierung, Gesetz- und Verordnungsblatt Nordrhein-Westfalen (GV. NRW.), Ausgabe 2006 Nr. 22 vom 16.8.2006, § 15 para 5 (https://recht.nrw.de/lmi/owa/br_vbl_detail_text?anw_nr=6&vd_id=1417&vd_back=N385&sg=&menu=1).

2.6.4 Outcomes and problem areas in relation to ‘must carry’ and EPG rules

2.6.4.1 ‘Must carry’

The importance of ‘must carry’ obligations for transmitting specified broadcasting channels to meet general interest objectives has been decreasing since broadcasting networks are digitised, but may not generally disappear:

- Digitisation has largely removed capacity constraints on broadcasting networks, except for terrestrial transmission. The move towards higher definition of television may however lead to new capacity issues even though, in the longer run, advanced compression and transmission technologies may at least partially offset the effect of increased bandwidth demand in order to deliver higher definition.
- OTT platforms provide an additional way to distribute linear TV channels, catch-up TV and other video-on-demand content. OTT platforms, while becoming increasingly important, however, are unlikely to substitute traditional broadcasting for some time. There are no signs of extensive “cord-cutting” in Europe. In many Member States, the necessary NGA coverage and take-up is also yet insufficient to allow universal use of OTT platforms for viewing of television.
- Operators of broadcasting transmission networks which are also broadcasters may have an incentive to promote own TV services over the services of non-integrated broadcasters. While this may not affect general interest channels with high audience shares, which are indispensable for networks and platforms to attract subscribers, issues may emerge in relation to channels with smaller audiences.

These issues are further discussed below.

Capacity constraints

Except for terrestrial transmission, capacity of broadcasting networks is currently no longer an issue because of digitisation. The number of channels that can be carried on cable, IPTV and satellite platforms has multiplied and capacity constraints currently no longer exist in practice. Capacity constraints may however become an issue again if a large number of channels were to be simulcast in, or fully migrated to, HDTV or UHD TV. HDTV, and even more so, UHD TV require significantly more bandwidth than standard definition television. This may lead to capacity issues even though over time advanced transmission technologies and further improvements in compression

technologies may at least partially offset the bandwidth demands driven by the higher definition of video.³⁵²

OTT platforms

Online streaming of TV channels has become another distribution way. With increasing coverage and penetration of NGA broadband, streaming of TV services over the internet becomes available to a rising percentage of households. However, this is not to say that online streaming may substitute traditional broadcasting transmission. Few households have cancelled their TV subscription to rely solely on OTT platforms on the public internet.³⁵³ Moreover, the capacity and reliability of networks required to stream live linear TV 'over the top', notably live sporting events or 'must watch' dramas and documentaries, may currently still suffer from minor quality of services issues at places. This depends also on the extent to which OTT provision of TV channels is supported by CDN technologies. There are many Member States where coverage and up-take of NGA networks is insufficient and OTT platforms therefore do not represent a viable alternative for TV viewers. In mid-2015, NGA coverage in the EU was on average 71% of households, and NGA penetration is stood at 22% households³⁵⁴.

Discrimination

Discrimination against specified broadcasting channels that meet general interest objectives, when gaining access to broadcasting transmission, has not been a relevant issue so far. This is because of the following factors:

- 'Must carry' obligations are applied in many Member States imposing access obligations on broadcasting networks with regard to specified channels (as set out above).
- Network and platform providers have a commercial interest to offer attractive content (including national channels of public broadcasters) and fill up capacity (with regional and local channels). This is further strengthened by competition between platform providers.

In Member States where access to broadcasting networks is no longer regulated and where 'must carry' obligations have been abandoned or do not exist, access to broadcasting transmission networks is subject to commercial agreement only. Operators of broadcasting transmission networks which are vertically integrated into production and packaging of TV channels may have an incentive to promote own

³⁵² Section 2.6.1.1.2. See also Analysys Mason (2014), New service developments in the broadcast sector and their implications for network infrastructure, Study for Ofcom, 2014.

³⁵³ On the extent of 'cord cutting' which - strictly speaking - relates to the substitution of a pay-TV subscription by a VOD subscription, see Grece, C., Note 3 - The SVOD Market In The EU Developments 2014/2015, A publication by the European Audiovisual Observatory, November 2015.

³⁵⁴ See Section 2.6.1.2.2.

services over the services of non-integrated broadcasters. General interest channels, however, need to be present on any broadcasting network and platform to attract customers and are likely to be distributed to viewers also in the absence of 'must carry' obligations. This is also suggested by the experience of countries that do not impose a 'must carry' obligation. In Spain and the UK, general interest channels are distributed on cable, satellite and IPTV networks in the absence of explicit 'must carry' obligations. The same holds for Italy for satellite and IPTV networks.

While the absence of 'must carry' obligations may not affect access of general interest channels with large audience shares, access conditions for channels with smaller audience shares may potentially deteriorate. This may be a prospective problem, notably if capacity issues arise with the migration to HDTV and UHD TV format.

The fact, however, is that the capacity available on cable, IPTV and satellite platforms, together with the increased availability of online platforms on NGA networks, provides ample capacity to transmit television channels today.

Stakeholder views

The majority of stakeholders both in the Commission consultation on the review of the regulatory framework for electronic communications³⁵⁵ and our own interviews take the view that 'must-carry' rules are no longer well suited to new and emerging market and technological realities. The views on their relevance, however, sharply differ:

- Some Member States and most broadcasters consider that the scope of 'must carry' rules which refer to specified radio and television broadcast channels and complementary services is insufficient. According to public broadcasters, they should also cover interactive and non-linear services and hybrid TV signalling, and should apply on a technologically neutral basis to all distributors of audiovisual content. This would extend the scope of services benefitting from 'must carry' to specified non-linear content necessary to meet general interest objectives. It would also make OTT platforms that provide linear channels and non-linear content over the public internet potentially subject to 'must carry' obligations. One public broadcaster noted that, even in countries where must carry has not been invoked, it should be included among the tools that a Member State may draw upon should a broadcaster and platform fail to reach an appropriate commercial agreement in order to encourage negotiations.
- Telecom operators point out the lack of a level playing field between broadcasters and online platforms to facilitate access to TV channels and other content and suggest 'must offer' obligations for broadcasters and content owners.

355 European Commission (2016), Synopsis Report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, Brussels.

- Some cable and network operators take the view that must-carry obligations are generally redundant or at least for those channels beyond the main/most essential general interest channels. Some argued that unclear or overly broad application of ‘must carry’ occasionally distorts negotiations.

2.6.4.2 EPG rules

Specified general interest channels are currently easily findable even in the absence of EPG rules, but this may become an issue in the future.

- With the ever increasing volume and diversity of linear and non-linear content (catch-up TV and other on-demand video), specified television broadcasting content may become more difficult to find.
- EPGs and remote controls related to traditional broadcasting channels will become outdated as navigation tools. End-users are increasingly using new user interfaces for online streaming over connected TV (apps, media screens) for navigation.
- Viewers increasingly use search and recommendation facilities based on their own viewing habits and the viewing habits of peer groups. The use of personal data in recommendation tools allows service providers to offer content adapted to a user’s preferences. However, if such tools focus too heavily on personal data and provide only a narrow set of recommendations, this could constrain content diversity.
- Discrimination has not been a crucial issue, likely because of existing EPG prominence rules in place or because of commercial incentives of EPG providers to put specified broadcasting content (national channels of public broadcasters or other selected channels) first. It should, however, be noted that issues may remain: EPG providers may also be content providers and may discriminate against providers of similar content (vertical market power).

Overall, the main concern is “...the page ranking (...) since public channels might lose their prime position, EPG providers might unduly favour commercial parties with which they have contractual agreements and, given the fact that consumers may compile their own list of favourites and EPG providers may, as search engines do, personalize the search results on the basis of the personal profile of a particular consumer, some fear that this might diminish the possible serendipity and result in a filter bubble.”³⁵⁶

³⁵⁶ Van der Sloot, B. (2012), Walking a Thin Line: The Regulation of EPGs, 3, JIPITEC 138, p. 140.

Stakeholder views

Most respondents both in the Commission consultation on the review of the regulatory framework for electronic communications³⁵⁷ and our own interviews agree that the ordering and presentation of channels on navigation interfaces is crucial for user choices.

At the same time, a majority was unaware of current problems for viewers to find any specific broadcasting content.

Access issues in relation to user interfaces were raised by a trade group representing radio broadcasters. It pointed out that, with mobile devices or any screen-based device, the traditional channel selection functionalities for radio or other services are replaced by icons. The presence of a radio icon on the screen is not always ascertained. More and more, licensed radio broadcasters are developing national portals gathering a maximum of national licensed radio broadcasters such as Radioplayer in the UK, Ireland, Germany, Austria, Norway and Belgium. As these portals gather most of the radio broadcasters that receive a licence to broadcast, their icons should be present on devices' screens. The radio channels are also listed in applications which have no obligation to include all radio channels and could easily delist a licensed radio channel.

Media regulators and some telecoms and cable operators took the view that ensuring non-discrimination of general interest content on EPGs would be sufficient. Public service broadcasters considered that Member States should be competent to ensure 'findability' of specified broadcasting content on user interfaces of significant networks and audiovisual platforms and that regulated EPGs should be included in new TV sets. A pay-TV provider considered that prominence of content could also be improved by better referencing/tagging of national and European offers. Several network operators point to the need for broadcasters to make real-time signalling available in order for EPGs to work satisfactorily.

³⁵⁷ European Commission (2016), Synopsis report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, Brussels.

2.6.5 Institutional functioning

Institutions with legal authority in the broadcasting sector include independent regulatory authorities, government ministries, and other official institutions (excluding courts and competition authorities). In addition to these national-level institutions, there may be sub-national (local and regional) institutions with legal authority in the sector. Finally, there are also institutions without formal legal authority that have a role in regulating the sector, such as industry self- or co-regulatory bodies and advisory committees. A converged regulator with full jurisdiction over both the electronic communications and broadcasting sectors under the same management is found only in Finland, Italy, and the UK. Austria has both legal frameworks covered by the same regulatory organisation, but under different management. Poland is in the process of evolving to a converged regulator, and Spain is considering doing so. In some Member States, responsibilities for the broadcasting sector are shared between a regulator and one or more government ministries.

The most complex institutional structures regulating the broadcasting sector may be found in the four Member States where there are local or regional authorities in addition to national-level authorities. Belgium, Germany, Italy and Spain all feature sub-national regulatory authorities:

- Belgium is a federal state where competences are split between the Federal State and three communities (Flemish, French-speaking and German-speaking communities). Broadcasting falls within the scope of the Communities' competence, each of them being responsible for broadcasting on their respective 'territory'. There is an exception for the Region of Brussels, where in certain circumstances³⁵⁸ it is the Federal State that is responsible for broadcasting. The Federal State is also responsible for electronic communications including global allocation and monitoring of spectrum. As a consequence, there are four regulators in charge of broadcasting: one per Community and one for Brussels. Each regulator is competent for content issues but also for transmission issues linked to broadcasting. In addition, there is one national regulator in charge of electronic communications for the whole country.
- Germany is a federal state and competences are split between the national level and the 16 federal states. Federal states have their own parliaments and governments. Media regulation falls in the competence of the federal states and is performed by the federal states' governments (e.g. licensing of public service broadcasters and policy issues) and the regional media authorities.³⁵⁹ Some issues are harmonised by Interstate Treaties between the federal states (such a treaty has the same legal effect as a law; it needs approval of the federal states'

³⁵⁸ Art. 127(2) Belgian Constitution,.

³⁵⁹ There are 15 regional media authorities; each federal state has its own, Berlin and Brandenburg have a common media authority.

parliaments). Some issues are harmonised by joint working groups of the regional media authorities. The regional media authorities are responsible for licensing of private broadcasters and 'must carry' regulation. Spectrum management is split between the federal level and the federal states level. On the federal level, the telecoms regulator (Bundesnetzagentur, or BNetzA) issues frequency licenses to infrastructure operators. The capacity realised by the same frequencies is allocated to broadcasters by the regional media authorities under federal states' legislation.³⁶⁰

- In Italy, regional and/or provincial authorities give authorisations for content providers for regional/provincial digital terrestrial broadcasting. There are 20 regions, of which five are autonomous, and 110 provinces in Italy.
- In Spain, the independent broadcasting authority at the national level is the converged regulator, the National Commission on Markets and Competition (NCMC). In addition, at the regional level, all autonomous regions have broadcasting responsibilities which are exercised directly by the regional government or by independent regional audiovisual councils (Cataluña, Andalucía and Navarra).

However, the responsibility for 'must carry' and for rules on conditional access systems (decoders) does not always rest with the media regulators. In Denmark, for example, it is the electronic communications regulatory authority which is competent in this area.

2.6.6 The performance of key RFEC provisions relating to 'must carry' and EPG rules

This section assesses the provisions on 'must carry' and EPG rules against the criteria (i) effectiveness, (ii) efficiency, (iii) coherence, (iv) relevance and (v) EU value added. In doing so, it should be noted that regulation of electronic communication networks and services can only address deficiencies as far as their causes find their origin in rules (or the absence of rules) within its scope. It is clear that 'must carry' obligations and provisions with regard to prominence of specified broadcasting content in EPGs, while included in the sector framework for electronic communications services and networks, have implications and objectives that go well beyond the framework under review in this

360 Deutschlandfunk is one of the two radio programmes of Deutschlandradio, a public service broadcaster. Its legal basis is a treaty of the 16 federal states. Like other German public service broadcasters it does not have a real content regulator, but its own self-regulating council (with representatives of the federal states and various social interest groups). It was founded by the US military as "RIAS" and between 1960 and 1990 it was based on the (Western Germany's) federation's competence to re-unite Germany, as it was argued that the programme was not broadcasting, but a re-unification activity. Between 1990 and 1994 its legal status was vague, but since 1994 it is based on a state treaty of the federal states.

study. Most important, national media policies that are not coordinated by the Audiovisual Media Services Directive are of relevance here.

2.6.6.1 Effectiveness

The objectives of ‘must carry’ and prominence rules for specified broadcasting content go well beyond the central objectives of the regulatory framework for electronic communications. The latter’s focus is on promotion of end-user interest, competition and the single market. At the same time, ‘must carry’ and EPG rules support the distribution of general interest content³⁶¹ and, above all, are to contribute to freedom of speech, pluralism and cultural diversity.

Article 31(1) USD clearly states that ‘must carry’ obligations shall only be imposed where they are necessary to meet general interest objectives as clearly defined by each Member State, and they shall be proportionate and transparent. The scope of radio and television broadcasting channels defined by Member States to be necessary to meet general interest objectives (such as media pluralism and freedom of expression) is beyond the scope of this study. We have therefore focused on capacity constraints and associated competition concerns that might render ‘must carry’ obligations necessary.

The increase in the transmission capacity of broadcast networks as a result of the digitisation of the networks, and the implementation of new transmission standards and compression technologies allow for a substantial number of channels on cable, satellite and IPTV networks, while DTT is more capacity constrained. The competition between traditional broadcast platforms (terrestrial, cable, satellite and IPTV) as well as new OTT platforms, and the commercial incentive of network and platform operators to carry channels to exploit existing capacity, raises doubts on whether existing ‘must carry’ obligations generally continue to be required. Thus, it is likely that specified channels necessary to meet general interest objectives may be transmitted also in the absence of ‘must carry’ obligations.

This may however not be the universal outcome across all Member States (see also Section 2.6.1.1.2):

- Availability and penetration: Member States differ with regard to the broadcasting networks present and the amount of FTTx roll-out and take-up. In many Member States, FTTx roll-out and/or penetration is insufficient, and (managed) IPTV platforms or OTT platforms are not available to TV viewers throughout the national territory. In some Member States, there are no cable networks (Greece and Italy). Cable, where present, does not always provide universal coverage and in some Member States is not yet fully digitised.

³⁶¹ EPG rules may also support the distribution of other audiovisual content.

- Capacity: While digitisation has allowed overcoming many of the historical capacity constraints, capacity issues still exist in Member States with continued reliance on terrestrial networks given that DTT is generally much more capacity constrained than digital cable and satellite or IPTV. Further capacity issues may emerge during the transition to HDTV or UHDTV programmes, since the progress in transmission standards and compression technologies may not initially offset the required increase of bandwidth for higher definition video.

Therefore, Article 31 USD, which allows Member States to impose ‘must carry’ rules, continues to provide an effective safeguard for some individual Member States.

2.6.6.2 Efficiency

An assessment of the efficiency of ‘must carry’ obligations in individual Member States would involve an analysis of the contribution of ‘must carry’ channels to general interest objectives such as freedom of speech, diversity of opinion, and cultural diversity. Such an analysis is beyond the scope of the regulatory framework for electronic communications and of this study.

The efficiency of the national provisions implementing Article 31 can nevertheless be assessed in one aspect - whether the Member States defined the threshold of ‘a significant number of end-users’ using networks with ‘must carry’ obligations as their principal means to receive radio and television broadcast channels so low that the obligation places a disproportionate burden on platforms subject to competition from other platforms. Quantitative definitions for a “significant number of end-users are applied in France (‘must carry’ includes local channels if more than 3% of households in the relevant geographic area connected), Netherlands and Poland (more than 100.000 subscribers), and Sweden (connection of more than 100 homes for carriage of designated local channels).³⁶² We note that Member States have used to a maximum extent the considerable discretion that the lack of precision of the “significant number of end-users” that Article 31 is giving them.

Finally, efficiency could be promoted by exempting network operators from must-carry obligations if they can prove to the supervisory authority that another provider in the same region on the same type of network, with the same type of reception equipment and without any extra costs for the receivers, already provides ‘must carry’ channels, or if the provider can prove that another provider has met the requirements of diversity set by the ‘must carry’ regulations. This seems to be the German approach.³⁶³ In this way the principle of ‘minimum regulation’ and proportionality as foreseen by Article 8(1) of the Framework Directive would be respected, fostering market entry without hampering

³⁶² See Table 46.

³⁶³ See Van Eijck N. and B. van der Sloot (2012), *Must-carry Regulation: a Must or a Burden?*, *IRIS plus* 2012/5, p. 16

end-users' access to specified radio and television broadcast channels and complementary services.

2.6.6.3 Coherence

2.6.6.3.1 Net neutrality

Under Article 3(3) of the Open Internet Regulation, providers of internet access services must "treat all traffic equally, when providing internet access services, without discrimination, restriction or interference, and irrespective of the sender and receiver, the content accessed or distributed, the applications or services used or provided, or the terminal equipment used". No similar non-discrimination obligation is set in Article 6(4) Access Directive, which leaves complete discretion as regards the manner in which Member States "*impose obligations in relation to the presentational aspect of electronic programme guides and similar listing and navigation facilities*". As mentioned, the UK, for example, imposes platform operators (such as Virgin and Sky) to give due prominence to public service channels, which could have the effect that the other broadcasters' chances of presentation is unduly diminished.

2.6.6.3.2 Technological neutrality

"Must carry" obligations can be imposed on "undertakings providing electronic communications networks used for the distribution of radio or television broadcast channels to the public". Consequently, must carry obligations cannot be imposed on platforms which provide TV services over the open³⁶⁴ Internet (such as e.g. Zattoo, Magine) as they do not operate electronic communications networks.

A recent administrative decision in the Netherlands³⁶⁵ illustrates this. KPN launched an over-the-top (OTT) service called "Play" offering to subscribers a package with 18 linear television channels, catch-up television, on-demand-content, and recording options for a flat rate fee per month. On the basis of Article 6(13) of the Dutch Media Act 2008, KPN, as broadcasting network operator, is subject to 'must carry' obligations. Article 6(14)(d) of the Dutch Act provides that the media regulator (Commissariaat voor de

³⁶⁴ 'Open' means that the service is available using Internet access from any Internet service provider as opposed to IPTV services which can only be accessed (are bundled with) the internet access service of specific providers.

³⁶⁵ Commissariaat voor de Media, Beslissing op bezwaar van KPN, decision of 14 juli 2015, 642766/649322, Ontheffingsverzoek artikel 6.14d van de Mediawet 2008 (Wet van 29 december 2008 tot vaststelling van een nieuwe Mediawet, Staatsblad 2008, 583, <http://wetten.overheid.nl/BWBR0025028/2016-05-20>), available on: <http://www.cvdm.nl/wp-content/uploads/2015/07/KPN-bob.pdf>. See also Eskens, S.J. (2016), Dutch telecom company granted exemption from 'must carry' rules for new app, IRIS 2016-1:1/26.

Media) may exempt a company from 'must carry' obligations. In July 2015, the media regulator granted the exemption³⁶⁶ taking into account that:

- The market for apps is different from traditional cable networks. In the case of apps, there is no lack of competition or scarcity that may cause an incomplete range of channels for the end-user to choose from.
- Apps like Play are not for a significant amount of users the primary means to receive television and radio signals.
- KPN had demonstrated that compliance with the 'must carry' obligation would result in sizable extra costs for KPN threatening the commercial viability of the service.
- KPN would be unable to respond to consumer demands to pay only for content they wish to receive. This would hinder innovation, partly to the detriment to the end-user.

As shown by this Decision, a problematic issue of 'must carry' is the remuneration which may have to be paid by the beneficiaries of the obligation or the subscribers of the service³⁶⁷ to the network operator. The Directives confirm "*the ability of Member States to determine appropriate remuneration, if any, (...) while ensuring that, in similar circumstances, there is no discrimination in the treatment of undertakings providing electronic communications networks. Where remuneration is provided for, Member States shall ensure that it is applied in a proportionate and transparent manner*". As shown in Table 48 above, this provision has led to a wide variety of national approaches. Although public broadcasters and commercial broadcasters are increasingly competing for viewers and, in many Member States, for advertisement revenues, the Directives do not require that beneficiaries of 'must carry' would pay transmission fees similar to those charged to comparable other TV channels on the platform. At the same time, platforms are bound to remunerate rights-holders for the TV channels they transmit. An obligation to carry the content for free while the operator must pay copyright remuneration may appear disproportionate.³⁶⁸

The lack of an obligation for OTT providers to carry specified television channels necessary to meet general interest objectives would also create barriers for viewers to

³⁶⁶ The exemption will be reviewed by 1 January 2017.

³⁶⁷ In France, Article 34-2 of the Act of 30 September 1986, requires the platform operators to make the 'must carry' France Télévisions TV channels "available free of charge to their subscribers" (Loi n° 86-1067 du 30 septembre 1986 relative à la liberté de communication (Loi Léotard), JORF du 1 octobre 1986, p. 11755, <https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=LEGITEXT000006068930&dateTexte=20110823>).

³⁶⁸ Welker, K. (2015), Hamburg Administrative Court refuses claim to free distribution of "must carry" programmes, IRIS 2015-7:1/8. The article summarizes the judgment of the Verwaltungsgericht Hamburg of 29 April 2015 in case no. 17 K 1672/13 available on: <http://justiz.hamburg.de/contentblob/4505570/data/17-k-1672-13-urteil-vom-29-04-15.pdf>.

access, find and consume such content *provided* such OTT platforms were used by a significant number of end-users as their principle means to access television channels.

2.6.6.3.3 Competition law

Must-offer is an obligation on a broadcaster to offer his content to one or more broadcasting platforms. Today, only a few member States such as the Czech Republic, France, and the UK³⁶⁹ have must-offer obligations. As a consequence of the success of triple and quadruple play offers as well as of OTT pay-TV sites, the absence of ‘must offer’ obligations may hamper the ability of smaller operators to launch IPTV offers.

At the same time, ‘must offer’ obligations have been imposed in merger decisions. For example, In Spain, one of the conditions for the 2002 merger³⁷⁰ between Sogecable and Via Digital (satellite pay-TV platforms) was the obligation to offer to third parties at least one premium channel as well as the thematic channels directly produced by Sogecable or commissioned by Sogecable from third parties. Furthermore, if Sogecable acquired exclusive retransmission rights for the Spanish Football League and other premium sports content, it had to sublicense those rights to free-to-air and pay per view TV. The commitments had a duration of 5 years. Similarly, the EU Commission approved Liberty Global’s acquisition of a controlling stake in De Vijver Media, subject among other to the commitment of licensing to third parties the channels Vier and Vijf, as well as any new basic pay TV channel that De Vijver may launch in the future.

2.6.6.4 Relevance

Given potential capacity issues during simulcast of and/or full migration to HDTV/UHDTV, the possibility to impose ‘must carry’ obligations continues to be of relevance for individual Member States. OTT platforms which offer packages of linear TV services will also not become a full substitute for traditional broadcast networks for some time to come given that roll-out and coverage of NGA networks remain less than universal.³⁷¹

³⁶⁹ In the UK, the public service broadcasters are subject to a must offer obligation in relation to the availability of the PSB channels on all platforms.

³⁷⁰ Comisión Nacional de los Mercados y la Competencia (CNMC), Decision of 13 September 2002, Merger N-280, SOGECABLE / VÍA DIGITAL, <http://www.cnmc.es/desktopmodules/buscadorexpedientes/mostrarfichero.aspx?dueno=1&codigoMetadato=15989>, available on: <http://www.cnmc.es/desktopmodules/buscadorexpedientes/mostrarfichero.aspx?dueno=1&codigoMetadato=15989>

³⁷¹ See also Section .2.6.1.2.2 and Section 2.6.2.3.1.

2.6.6.5 Conclusion

2.6.6.5.1 'Must carry'

Article 31 USD, which allows Member States under certain conditions to impose 'must carry' obligations for specified radio and television broadcast channels, provides a safeguard for individual Member States, which continues to be relevant in the vast majority of Member States to date. Such rules were also imposed in the majority of Member States surveyed for this study (6 out of 9). However, it is important that the conditions for the imposition of 'must carry' obligations stipulated in Article 31 USD continue to be properly respected in a rapidly changing technological and commercial context:

- 'Must carry' obligations may only be imposed where they are necessary to meet the general interest objectives as clearly specified by Member States. In practice, according to the different cultural policies and media laws in the EU, each Member State defines which programmes or channels qualify as general interest content. However, the criterion "necessary to meet the general interest objectives" also implies that the specified radio and television broadcast channels that benefit from 'must carry' obligations were unlikely to be distributed in the absence of such obligations, e.g., because capacity constraints would prevent network/platform operators from transmitting the channels.
- Only networks and platforms that are used by a significant number of end-users as their principal means to receive radio and television broadcast channels can be made subject to a 'must carry' obligation.

2.6.6.5.2 EPG rules

EPG rules – as provided for under Articles 5(1)(b) and 6(4) of the Access Directive - acknowledge that Member States may impose obligations on operators to provide access to application program interfaces (APIs) and/or electronic programme guides (EPGs) and, as regards the latter, "impose obligations in relation to the presentational aspect of electronic programme guides and similar listing and navigation facilities". Such obligations were nonetheless only imposed in a minority of Member States surveyed (3 out of 9).

Findability of radio and television channels that meet general interest objectives has not been an issue so far. In fact, these channels continue to be easily findable on EPGs and other navigational facilities.

This may, however, change if the number of channels further multiplies and as channel ranks (numbers) are substituted by logos in a variety of navigational interfaces.

3 A view toward the future

In this chapter of the report, we identify strengths and weaknesses of those aspects of the European RFEC that we have been called on to study, provide a Problem definition, identify candidate Action Lines that have the potential to address or mitigate various aspects of the Problem, group the Action Lines into Options, and compare the Options in terms of their anticipated advantages and disadvantages.

3.1 Methodology for this forward-looking analysis

Our overall methodological approach is described in Section 1.2.

Our approach to this forward-looking portion of the analysis is broadly in line with the *Better Regulation Guidelines*³⁷² that the Commission issued in May 2015; however, we have not provided a full Impact Assessment. Notably, we have not attempted to assess the impacts of the different Options.

In light of the breadth and complexity of the subject matter, we have made extensive use of *SWOT analysis* (see Section 3.1.1) as a means of clarifying what is working well, versus what leaves room for improvement, in the current implementation of the relevant substantive domains of the RFEC. The use of SWOT analysis helps us to link the *ex post* assessment of how the RFEC has functioned to date to the forward-looking delineation of Options. The weaknesses identified in the SWOT analysis flow directly into the definition of the Problem for Better Regulation purposes.

As a further response to the breadth and complexity of the material, we have found it useful to delineate and motivate the individual Action Lines that comprise the Options that we put forward. The Better Regulation Guidelines do not explicitly define Action Lines, but Options tend in practice to be made up of multiple Action Lines. In the present complicated analysis, many of the Action Lines flow into more than one of the Options, as is evident in Table 58. Identifying them in a distinct step, before proceeding to delineation of Options, provides greater clarity.

³⁷² European Commission (2015), *Better Regulation Guidelines*, SWD (2015) 111.

3.1.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework

In this chapter, we provide a *SWOT analysis* (covering *Strengths*, *Weaknesses*, *Opportunities* and *Threats* associated with the implementation of the relevant key provisions of the RFEC that are covered by this study.

As the Commission's *Better Regulation Toolbox*³⁷³ notes, "A *SWOT analysis* is used to identify the *Strengths*, *Weaknesses*, *Opportunities* and *Threats* in relation to a project/organisation and how such an assessment will change over time. In the context of evaluation, this method can be used ... when assessing the services provided by a project/programme."

In the SWOT analysis that follows, the Strengths and Opportunities are positive, while the Weaknesses and Threats are negative. The Strengths and Weaknesses are already visible or predictable (i.e., they would most likely happen in the absence of policy initiatives beyond those that are already fairly certain), while the Opportunities and Threats depend on events that are not already firmly on their way (including disruptive market or technological developments – for instance, unexpectedly rapid improvements in the technology of dynamic spectrum assignment).

The SWOT represents a simple and easily grasped way of summarising the key evaluation results of Chapter 2 in terms of efficiency, effectiveness, relevance, coherence, and European added value of the current implementation of relevant aspects of the RFEC (see Sections 2.1.6, 2.2.6, 2.3.7, 2.4.5, 2.5.7 and 2.6.6, each of which is summarised in the "Problem definition and problem drivers" sub-section for the corresponding thematic area). These Chapter 2 findings drive the Strengths and Weaknesses, which are crucial to an understanding of the Problem.

Of greater immediate significance, the SWOT flows naturally into the proposals for policy development in this chapter. The candidate or potential Action Lines identified for each thematic area are driven by the need to mitigate the Weaknesses and Threats identified by the SWOT, as elaborated in the Problem definition that follows the SWOT in the section for the corresponding thematic area, and to capitalise on the Strengths and realise the Opportunities.

In some cases, the Strengths and Weaknesses are closely related to one another – they are opposite sides of the same coin. A Weakness might reflect, for instance, a gap in coverage of a Strength. In the analysis that follows, we depict these cases by assigning sequential numbers to the Strengths and Weaknesses where this is so. In many other cases, however, there is no direct correspondence – a strength might be

³⁷³ European Commission (2015), *Better Regulation "Toolbox"*, complements *Better Regulation Guidelines in SWD* (2015) 111., pp. 382-383.

unqualified, or an opportunity might flow from a circumstance that does not appear to give rise to a corresponding threat. We reflect these distinctions in each SWOT analysis table.

There are significant linkages among the six thematic areas (market entry, spectrum, numbers, access to land and rights of way, end-user rights, and ‘must carry’ and EPG rules) that we have been called upon to analyse, but the six thematic areas are also distinct to a very significant degree. Elements specific to each thematic area are visible in the SWOT and in the discussion of aspects of the Problem relevant to that thematic area. We have identified common themes in an overall SWOT in Section 3.9.1.

3.1.2 Problem definition, problem drivers, and linkage to the SWOT analysis

Once again, we have found it convenient to assess relevant aspects of the Problem separately for each of the six thematic areas. In each case, the SWOT provides a brief summary, while the discussion of elements of the Problem for each thematic area serves as a reminder of the main conclusions of the assessment that appeared in Chapter 2.

Elements of the problem prove to be recurring themes across the thematic areas (see Section 3.9). Noteworthy are the substantial differences in implementation of the RFEC among the Member States, despite the use of a common framework for electronic communications; some of these differences are relatively benign, while others may be harmful.

The other noteworthy common thread across the thematic areas is the pervasive influence of technology, together with the corresponding evolution of market structures and value chains. Technology improvements tend to enhance European societal welfare, and they sometimes ameliorate the challenges that drove the need for regulation; however, technology changes sometimes drive new regulatory requirements. Among the broad shifts in technology and value chains that influence multiple thematic areas are (1) the growing relevance of OTT services; and (2) machine-to-machine communication and the Internet of Things (M2M and IoT).

For each of the thematic areas,

- the definition of the Problem flows directly from the Weaknesses identified in the SWOT analysis;
- the Threats and Opportunities are reflected in a section that explains how the Action Lines would need to respond to possible future developments; and
- the Opportunities are also reflected where relevant in the Action Lines, since some Opportunities constitute Actions that might potentially be taken.

3.1.3 Candidate Action Lines and their relationship to Options

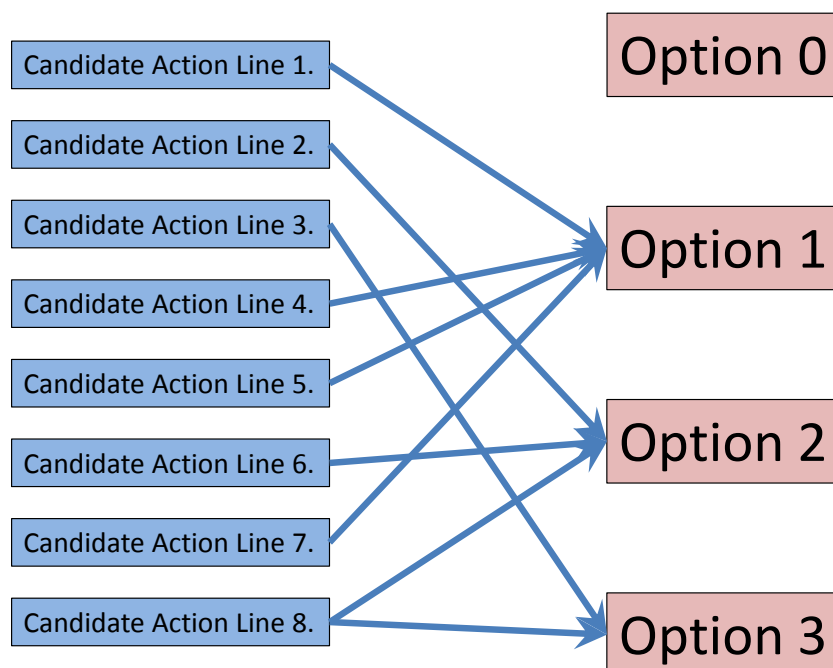
In an Impact Assessment, one typically progresses directly from the definition of the Problem to the Options. Each of the Options is comprised of multiple elements that can be thought of as being Action Lines.

For this study, we are dealing with multiple thematic elements with complex interrelationships. Some Action Lines appear in multiple Options. We feel that the Action Lines are best understood in conjunction with the Problem element that they seek to address, rather than with one or more of the Options of which they form a component. For that reason, we explain the rationale for each candidate Action Line in the section related to the corresponding thematic area.

Most Action Lines represent potential changes to the RFEC and related instruments. A few represent potential changes to other legislative instruments. A few others may not require legislative changes at all. All are initiatives that the European institutions could potentially undertake.

The general relationship between Action Lines and Options is depicted in Figure 62. Options are comprised of Action Lines. A given candidate Action Line may appear in more than one Option. Since Option 0 (the “baseline scenario” Option) represents the baseline where no new initiatives are undertaken, no Action Lines are associated with it.

Figure 62: Candidate Action Lines and Options



In this chapter, we provide a range of candidate Action Lines. Not every candidate Action Line will turn out, in the end, to be feasible or cost-justified; however, we have attempted to exclude clearly infeasible Action Lines, except where needed for clarity of exposition.

In each instance, we seek to motivate why a candidate Action Line potentially addresses or mitigates some identified element of the Problem. Where appropriate, we also identify potential problems associated with each candidate Action Line. We do not, however, provide relative rankings or priorities. Our focus is on identifying Options and assessing advantages and disadvantages (which we do in Section 3.11.3).

The candidate Action Lines that follow are not mutually exclusive. For that matter, not all are mutually compatible. In each of the overall Options that we identify in Section 3.11, we select a constellation of mutually consistent Action Lines that have the potential to work in concert in support of the goals of the overall Option (see Section 3.11). In Section 3.11.3, where we discuss the advantages and disadvantages of the various Options, we also discuss the desirability and trade-offs among individual Action Lines.

3.2 Disruptive scenarios for the evolution of electronic communications in Europe

In conducting the evaluation of Chapter 1, we already presented key technological and market development trends to date for each of the thematic areas, and those most likely going forward, in Sections 2.1.1, 2.2.1, 2.3.1, 2.4.1, 2.5.1, and 2.6.1. For each thematic area, key elements are reviewed in the Problem definition in this chapter.

In this section, we consider less probable alternative scenarios, including scenarios that are highly disruptive. These flow into the Opportunities and Threats portions of the SWOT analyses, and from there into the Problem definition and into the candidate Action Lines.

3.2.1 Repeal of Moore's Law (the ever-improving price/performance of semiconductors and opto-electronics)

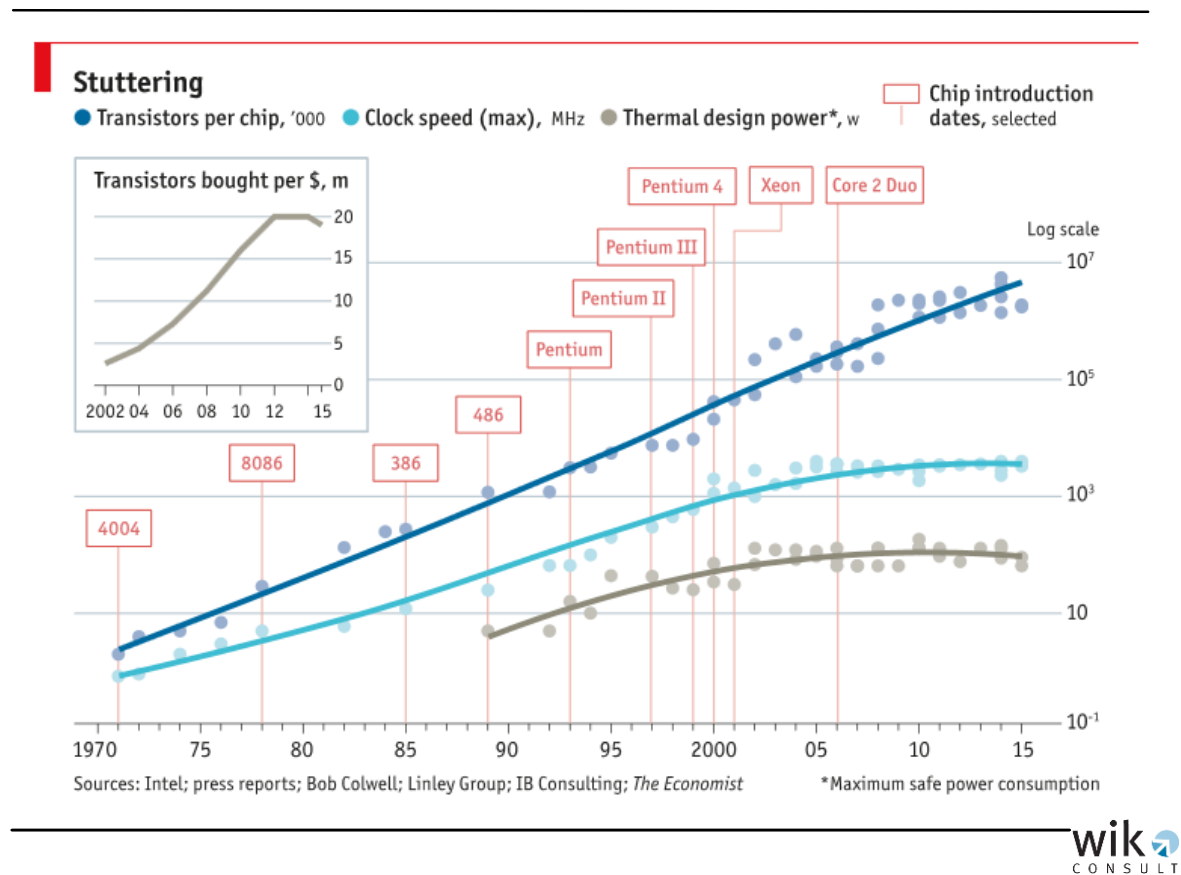
Since 1971, the price/performance of semiconductors has been improving by a factor of two every 18 to 24 months. These sustained and remarkable gains, referred to as *Moore's Law*,³⁷⁴ have made possible personal computers, smart phones, the internet, and the digitalisation of society in general. We are all familiar with the effects of Moore's

³⁷⁴ In a famous 1965 paper, Gordon Moore recognised that the number of components that could cost-effectively be implemented with a single integrated circuit was doubling per unit time. Moore (1965), Cramming more components onto integrated circuits, *Electronics*, Volume 38, Number 8, April 19, 1965.

Law. If we buy a personal computer today, it will cost no more than a personal computer that we could have bought two years ago, but it will be twice as fast, will have twice as much memory, and will likely have a hard disk drive (or semiconductor equivalent) that is twice as large.³⁷⁵

In interpreting the effects, which are shown in Figure 63, the reader should bear in mind that the figure is on a *logarithmic scale* – the improvement over 44 years represents gain of a factor of many millions.

Figure 63: Is Moore's Law approaching exhaustion? 1970 - 2015



Source: The Economist (2016), "After Moore's Law", Technology Quarterly (<http://www.economist.com/technology-quarterly/2016-03-12/after-moores-law>).

For decades, there have been claims that Moore's Law would soon run out of steam as the process of shrinking transistors approached physical limits. Those predictions have all proven to be premature. Today, however, there is an emerging consensus among technologists, and among the firms that manufacture semiconductors, that Moore's Law is truly running out of steam. This is already visible in the insert at the top left of Figure

³⁷⁵ Similar gains have also been experienced in opto-electronics, enabling fibre optics to carry progressively more data at a given cost.

63 – although the number of transistors per chip continues to increase, the price per transistor has suddenly gone flat.³⁷⁶

If this indeed comes to pass, it will not necessarily mean that progress on digitalisation stalls. The gains already achieved will remain. Semiconductor designers will continue to coax somewhat more performance of chips, but not necessarily at substantially lower unit cost. Software designers may be motivated to switch to more efficient algorithms as it becomes less practical to overwhelm every problem with massive computing power. Cloud computing and other massively parallel computing approaches will provide computing power where it is needed. What is likely to change, however, is that the nearly effortless gains that we have experienced in the price/performance of computing are likely to draw to an end (in the absence of some new breakthrough).

The precise implications, for the sector in general and for the RFEC in particular, are difficult to predict, but are likely to be substantial. These Moore's Law gains are thoroughly baked into all of our planning assumptions. It is fairly clear that the demand for spectrum in particular will be influenced, but how exactly?

In recent years, the volume of mobile internet traffic has steadily grown; at the same time, the unit cost of carrying that data has tended to decline thanks to Moore's Law.³⁷⁷ The traffic growth has largely been a function of the steadily improving capability and price/performance of smart phones, tablets, and personal computers, which is largely a consequence of Moore's Law. Successive generations of mobile technology have clearly also benefitted from Moore's Law gains, reducing unit costs and unit prices for mobile data. If Moore's Law approaches its limits, both tendencies may slow, with net effects that are complex.

These trends can be expected to have a long term impact on the demand for spectrum for mobile broadband. The rapid growth in mobile broadband traffic to date has largely been a consequence of Moore's Law improvements in the performance of smart phones, tablets and laptops, as well as the infrastructure components that support the mobile service (see Section 3.4.4).

3.2.2 Fixed lines decline substantially

Spectrum demand is also influenced in many ways by *fixed-mobile substitution* and by the related phenomenon of outright cancellation of the subscription to the fixed network.

The number of *fixed telephony lines* in many of the Member States has declined substantially over time. In Finland, it declined from 2.848.809 in the year 2000 to just

³⁷⁶ The Economist (2016), After Moore's Law, Technology Quarterly (<http://www.economist.com/technology-quarterly/2016-03-12/after-moores-law>).

³⁷⁷ Marcus; J. S. (2014), The economic impact of Internet traffic growth on network operators, (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2531782).

638.800 in 2014. In Italy, it declined from 27.153.000 to 20.570.000 over the same period; in Denmark, from 3.835.000 to 1.873.404 over the same period.³⁷⁸

This decline in the number of fixed telephony lines does not appear to equate to a substantial reduction in fixed broadband subscriptions to date, except perhaps to a very limited degree in Finland;³⁷⁹ it may, however, represent a limit to the expansion of the number of fixed broadband subscriptions going forward, unless consumers who disconnect from the fixed network due to lack of interest in fixed voice services choose to reconnect to the fixed network in order to subscribe to fixed Internet access services.

The substantial majority of all traffic to smart phones and tablets (which we think of as mobile devices) is in fact carried over Wi-Fi at home and at work, and thus over the fixed network. If future consumers do not maintain fixed network subscriptions, Wi-Fi back-haul for this traffic will not be available, with the result that the mobile network would need to carry several times as much traffic as is the case today.³⁸⁰

To date, the decline in fixed lines does not appear to be a significant factor relative to spectrum demand, but any shift in underlying trends might be important in terms of spectrum demand.

3.2.3 Dynamic spectrum management gains in effectiveness

In Section 2.2, we focused extensively on exclusive spectrum assignment of spectrum. As an alternative, improvements in spectrum sharing techniques, both in terms of technology and of regulatory practice, might enable spectrum sharing and/or dynamic allocation of spectrum to become a more effective alternative than is the case today. This would tend to reduce the need for exclusive assignments, thus reducing pressure on the spectrum assignment process.

Stakeholders recognise the potential benefits of better spectrum sharing arrangements. In responses to the Commission's Public Consultation,³⁸¹ 72% of the respondents agreed with the statement that more flexible and/or shared access to spectrum is needed to meet the future demand for spectrum, while only 18% disagreed. Shared access was considered to be necessary for (1) development of the Internet of Things (68% agree, while only 2% disagree), and for (2) development of M2M applications (64% agree, while 24% disagree); for wireless back-haul, however, only 34% agreed, while 55% disagreed.

³⁷⁸ ITU (2016), Fixed telephone subscriptions, Excel spreadsheet (http://www.itu.int/en/ITU-D/Statistics/Documents/statistics/2015/Fixed_tel_2000-2014.xls, viewed 14 June 2016).

³⁷⁹ Based on OECD (2015), OECD historical fixed broadband penetration rates, Excel spreadsheet (<http://www.oecd.org/sti/broadband/1.5-BBPenetrationHistorical-Data-2015-06.xls>, viewed 14 June 2016.)

³⁸⁰ Marcus and Burns (2013), Impact of traffic off-loading and related technological trends on the demand for wireless broadband spectrum (<http://bookshop.europa.eu/en/study-on-impact-of-traffic-off-loading-and-related-technological-trends-on-the-demand-for-wireless-broadband-spectrum-pbKK0113239>).

³⁸¹ Based on responses to Questions 85 and 86.

There are many forms of spectrum sharing, many of which reflect varying degrees of intelligence in the devices that use the radio spectrum.³⁸² The most obvious application today is Wi-Fi, which takes advantage of *licence exempt* spectrum access. More sophisticated approaches (some of which could be termed *software defined radio* or *cognitive radio*) dynamically identify and utilise spectrum that is apparently not in use at a given point in time.

Other forms of collective access depend on a more liberal approach to spectrum management (for instance, spectrum *underlay*, where low power usage is permitted to co-exist in bands that have other primary uses).

Some experts would argue that these advanced forms of spectrum usage will eventually make traditional exclusive spectrum assignments unnecessary. Whether this is really so, and if so, in what time frame, are important questions relative to spectrum management policy. Our belief is that exclusive assignments of spectrum in the WAPECS bands are likely to continue to be appropriate for at least ten years, and probably much longer.

3.2.4 Machine-to-machine / Internet of Things (M2M/IoT) begins to drive higher traffic usage

Most experts expect huge numbers of interconnected devices to enjoy wireless interconnection over the next few years. In just a few years from now, the number of interconnected devices is expected to greatly exceed the number of interconnected human beings. The impact on number assignment was a key element of Section 2.3.1.

To date, M2M has had only limited impact on spectrum management policy because the bandwidth required per device has been minimal. At the moment, this seems likely to continue to be the case. Exceptions (for instance, viewing of audiovisual content by passengers in self-driving connected vehicles) seem unlikely to drive a huge change.

Given the large number of devices, if this were to change, it could have large implications.

M2M however will require nationwide coverage of networks. Automotive, logistics and transport applications need to be applicable on all roads, railways and waterways.

³⁸² See for instance Forge, F., R. Horvitz, and C. Blackman (2012), Perspectives on the Value of Shared Spectrum Access - Final Report for the European Commission"; and Burns, J., et al. (2006), Study on Legal, Economic, & Technical Aspects of 'Collective Use' of Spectrum in the European Community.

3.2.5 Positive effects from various elements of the DSM increase cross-border network traffic

Many of the action lines of the Commission's Digital Single Market (DSM) strategy seek to promote cross-border e-commerce, which would result in additional cross-border internet traffic. Relevant measures include copyright modernisation, prohibitions on unjustified geo-blocking, modernisation of the Audiovisual Media Services Directive (AVMSD), VAT modernisation, lower prices for cross-border parcel delivery.

Audiovisual content represents a large fraction of mobile internet traffic,³⁸³ so even a shift that is small in percentage terms could have important implications.

3.2.6 The trend to ever-increasing numbers of fixed and mobile competitors stalls or reverses

As noted in Sections 2.1 and 2.2.5.3.1, the number of fixed competitors appears to have grown very substantially over the years, and the number of mobile competitors is also far greater than it was when the RFEC was first adopted in 2002; however, the number of mobile competitors appears to have been flat in 2014, and to have declined slightly in 2015 for the first time.

This change is not necessarily indicative of a defect (depending on local competitive conditions), but it is significant, and may have implications for policy going forward.

3.2.7 A tendency to increasing numbers of small cell sites puts increasing pressure on the need for access to land and rights of way

There has been a substantial increase in the number of small cells in recent years, partly due to the need to provide the ability to carry greater mobile traffic in dense metropolitan areas, and partly due to public Wi-Fi operations. Small cells operating at frequencies somewhat higher than the traditional mobile frequencies enable the same frequency bands to be *re-used*, thus obtaining greater total bandwidth.

Deployment of individual small cells tends to be less intrusive and less problematic than deployment of large cells; however, because a great many of them may be required, and in locations that were not previously cell sites, the total cost of a deployment in practice might be considerably higher than the cost of deploying a small number of cell sites employing sub-1 GHz spectrum.

³⁸³ Cisco (2016), Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2015–2020, Figure 26 (<http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.html>).

The migration to 5G is expected to result in considerable interest in deployment of 5G to support high bandwidth applications in frequency bands much higher than those typically used for mobile services today. Signal attenuates quickly in these bands, implying the need for a large number of cell sites to achieve coverage in dense areas.

The need for large numbers of sites may exacerbate existing challenges in obtaining access to land and to building permits and other administrative authorisations.

3.2.8 Changes caused by the revision of the RFEC

Changes to the RFEC can be expected to have some (endogenous) effect. Since these feedback loops will necessarily be considered as part of the forward-looking impact assessment in a separate project for the Commission, we ignore them here.

3.3 Market entry mechanisms

In this section, and for each of the subsequent sections describing one of the thematic areas, we first present (1) an assessment of strengths, weaknesses, opportunities and threats in the implementation of the relevant aspects of the European regulatory framework for electronic communications in the form of a SWOT analysis; (2) an explanation of the elements of the Problem, reflecting the SWOT analysis; (3) a series of candidate Action Lines that have the potential to address the Problem elements identified; and (4) discussion of how the candidate Action Lines might need to be adapted or amended to address different possible scenarios of market and technology evolution.

3.3.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework

Table 50: Strengths, weaknesses, opportunities and threats (SWOT): The market entry regime³⁸⁴

	Positive	Negative
	Strengths	Weaknesses
Current or predictable	<ol style="list-style-type: none"> Established market players report that the authorisation regime is not a problem for them. <ul style="list-style-type: none"> Administrative burdens appear to be low. Since the RFEC was enacted, fixed and mobile entry has occurred. New IP-based online and over-the-top (OTT) services have entered the market, sometimes with Notification, sometimes without the need for a Notification, depending on nationally applicable legal regimes .. 	<ol style="list-style-type: none"> For smaller firms seeking entry, detailed procedures that vary greatly among the Member States (together with widely varying administrative charges³⁸⁵ for authorisation) may possibly present a barrier to entry.³⁸⁶ The ability of non-ECS OTT services that compete with ECS to enter the market without a formal notification can be viewed as being a defect to the extent that it implies a competitive asymmetry.
Not fully predictable	<p>Opportunities</p> <ul style="list-style-type: none"> Further process improvements have been discussed: a common Notification form in English that must be accepted by all the Member States, an English language help desk for Notifications, online filing of the Notification, and/or elimination of the Notification altogether.³⁸⁷ Elimination of fees for undertakings with turnover below a threshold could be considered. 	<p>Threats</p> <ul style="list-style-type: none"> No significant threats specific to the authorisation regime are visible.

Source: WIK-Consult .

3.3.2 Problem definition and problem drivers

Our interviews indicate that existing authorisation mechanisms work well for existing market players, especially where they already have or will need to have physical presence in the Member State where they seek authorisation. Nonetheless, there are opportunities for improvement.

³⁸⁴ Where a Strength and a Weakness are opposite sides of the same coin, we have assigned the same sequence number to both; otherwise, we do not provide a sequence number.

³⁸⁵ In the sense meant by Art. 12 Authorisation Directive.

³⁸⁶ Interviewees indicated that the burden of achieving authorisation is negligible compared to the costs of establishing a physical presence in a Member State. This concern is thus most relevant to OTT firms that do not need to deploy a network, and for them is mainly an issue in the start-up phase.

³⁸⁷ It is already the case that Denmark and the UK do not have an explicit Notification.

Key problem elements, based on the SWOT analysis, are:

- Significantly divergent requirements among the Member States (see Section 3.3.2.1).
- Asymmetries between ECS and non-ECS OTT services (see Section 3.3.2.2).

Authorisation mechanisms constitute a key enabler to market entry, but access to spectrum, to numbers, and to land and rights of way are also essential to market entry. We deal with them in Sections 3.4, 3.5, and 3.6, respectively.

3.3.2.1 Significantly divergent requirements among the Member States

Existing firms report that current arrangements are not problematic. For an established firm that chooses to deploy network infrastructure into a Member State where they have not previously done business, the cost of filling out and filing a Notification form³⁸⁸ is minimal by comparison.

For smaller firms seeking market entry, however, detailed procedures that vary greatly among the Member States (together with widely varying charges for authorisation) may possibly present a barrier to entry. This may be especially so for small OTT services that would not otherwise need to establish a physical presence in the Member State in question.

Requirements among the Member States vary. As noted in Section 2.1.3.1, some Member States do not require an explicit Notification at all. In five Member States, Notification can be made electronically; elsewhere, a written Notification is necessary.

If the requirements were identical in all Member States, the need for multiple notifications might not be a significant issue. Given however that each Member State follows its own Notification procedures, with its own information requirements and its own administrative charges, the combined effect on smaller firms may be significant.

In the past, six Member States (Czech Republic, Greece, Hungary, Romania, Slovakia, Portugal) had notification requirements that went beyond requirements stated in Article 3(3) AuD. Following Commission action, these restrictions were withdrawn in Greece, Hungary, Romania, Slovakia, and Portugal (see Section 2.1.3.1).

In three Member States (Latvia, Malta, Slovenia), foreign EU operators are required to undergo registration or tax formalities beyond those of the Authorisation Directive.³⁸⁹

³⁸⁸ The UK and Denmark do not require a Notification form (see Section 2.1.3.1).

³⁸⁹ In Malta, any firm incorporated outside the country must provide an MFSC OC certificate (i.e. must register). In Latvia, all foreign operators must register with the Latvian Enterprise Register (or else establish a company in the country) prior to acquiring the right to provide ECS in Latvia. In Slovenia, foreign operators must either establish a company subsidiary with headquarters in Slovenia, or must

This is arguably somewhat at odds with the Authorisation Directive; however, undertakings entering the electronic communications markets in the Member States are subject to generally applicable national law, whether it be as regards the registration as a commercial company, the registration for VAT purposes, or the payment of taxes and contributions.

Annual administrative charges range from nothing to more than 1% of annual turnover (Malta), but in many of the Member States, charges are assessed only where turnover exceeds a predefined threshold (see Section 2.1.3.1). This is a wide range, and possibly represents an impediment to small firms that would not otherwise require a presence in a given Member State; however, the charges are not necessarily inconsistent with the guidelines in Article 12 of the Authorisation Directive. One would expect the relative cost to be highest in small Member States, where the (largely fixed) costs of maintaining an authorisation programme must be carried by a community of network operators that collectively have limited turnover. This is in fact the case: the only Member States that have administrative charges in excess of a modest 0.2% of turnover are Malta, Luxembourg, and Cyprus, all of which can be viewed as being small Member States.

3.3.2.2 Competitive asymmetry if non-ECS OTT services can enter the market without a Notification

Some argue that the ability of non-ECS OTT services (for our purposes, services that compete to some extent with ECS services, but do not fall within the definition of ECS services) to enter the market without a formal Notification is a defect that should be viewed as a competitive distortion.

This is part of a broader discussion about a level playing field between ECS and non-ECS OTT services. The aspects that are most specifically relevant to market entry mechanisms in terms of the Notification process are (1) the administrative burden of submitting the Notification in those Member States that require it, and (2) the fees that must be paid. There is an argument to be made that it is inappropriate that traditional network operators must pay authorisation fees to enter the market with voice services, while certain VoIP providers who compete with them do not necessarily pay.

The precise boundaries of this Problem element are complex. VoIP service providers that complete voice calls to devices with E.164 numbers are treated as ECS in most Member States, and thus are not exempted from Notification nor from payment of fees solely on that basis (see Section 1.5).

contact the Slovenian tax administration in the area where they plan to provide service, fill out the DR-04 form, and obtain a Slovenian tax number.

3.3.3 Candidate Action Lines relevant to market entry

Action Lines seek to address or mitigate aspects of the Problem. The key Problem elements identified in regard to market entry (based on the Weakness in the SWOT analysis of Section 3.3.1) are:

- Significantly divergent requirements among the Member States (see Section 3.3.3.1).
- Asymmetries between ECS and non-ECS OTT services (see Section 3.3.3.2).

Relevant candidate Action Lines have been identified as Opportunities in the SWOT.

3.3.3.1 Significantly divergent requirements among the Member States

There are several distinct implications of divergent requirements. A first is that diverse Notification requirements may pose a barrier to entry, primarily for small new entrants that do not have or need infrastructure in each of the Member States, even though the Authorisation Directive limits the information that can be demanded as part of the Notification process. A related aspect is that charges, even though limited, may impede the entry of small market players, especially where they do not require physical presence in the Member State; conversely, some established market players have complained that turnover-based charges are too high (see Section 2.1.3.2).

As regards challenges associated with Notification, numerous solutions have been discussed. “One stop shop” approaches have been proposed in the past, but these appear to entail hopeless complexity, and moreover were rejected by the Parliament and the Council in the deliberations leading to Regulation 2015/2120.

More promising ideas appear in BEREC’s assessment of the impact of administrative requirements on the provision of transnational business electronic communication services.³⁹⁰ BEREC proposed a number of best practices such as the ability to file online Notifications, simplification of the documents to be submitted to NRAs (especially concerning certified translations), acceptance of Notifications in a widely understood language such as English, and creation of an English language contact point. Perhaps most important, BEREC advocated development of “a harmonised format for notifications that would be used by NRAs in all EU countries, with standardized categories of networks and services and possibility to submit a description of the services which do not fall within any standard category.”³⁹¹

³⁹⁰ BEREC (2011), Report on the impact of administrative requirements on the provision of transnational business electronic communication services, BoR (11) 56, 8 December 2011.

³⁹¹ *Ibid.*

The use of a standardized form in a widely understood language³⁹² in all Member States would provide nearly the same benefit as the “one stop shop” with far less complexity. The key point is that a firm seeking authorisation should be able to file *the same Notification form in the same widely understood language in multiple Member States*. An online and/or telephone help desk in the same language(s), together with a willingness to accept supporting documents in the same language(s), might provide a fairly comprehensive solution at low cost.³⁹³

The exact content of a common form might require discussions with and among the Member States. A possible process would entail a recommendation formulated by BEREC, which could then guide the Commission in incorporating a common form into a suitable legislative instrument (such as for instance an amendment that would add an annex to the Authorisation Directive).

Candidate Action Line 1: Oblige all Member States to accept a common Notification form in a widely spoken European language, such as English. Each Member State would accept supporting documents in the same language, and would provide a help desk in the same language.

As regards the concern that administrative charges for authorisation³⁹⁴ (either on a one-time or on a recurring basis) are so high as to discourage market entry in multiple Member States by smaller undertakings, many Member States already implement rules where firms whose turnover is below some threshold are exempted from the obligation to pay (see Section 2.1.3.2). Article 12 of the Authorisation already places limits on the level of administrative charges, but it does not establish a minimum turnover threshold. Revision of this Article to establish a uniform threshold across the Member States would address any such concerns.

Candidate Action Line 2: Exempt providers of ECS whose relevant turnover is below a defined threshold from the obligation to pay administrative charges.

Some market players opined that basing payment for authorisation on turnover meant that they carried an unreasonable burden; however, we do not perceive that specific legislative Action Lines are called for. First, it is not clear that there is a significant problem here – in all but three Member States, administrative charges are not more than 0.2% of turnover. Those three Member States are Cyprus, Luxembourg, and Malta, all of which must carry the relevant costs of the authorisation programme³⁹⁵

³⁹² BEREC proposed this in terms of the English language. Today, one might argue that two or three widely spoken languages (for instance English, French and German) should be accepted.

³⁹³ There is no reason why Member States that wish, in addition, to support a (possibly different) form in their own language should not be permitted to do so.

³⁹⁴ We mean by this the charges imposed to cover the administrative costs of the general authorisation.

³⁹⁵ Administrative charges may cover only “*the administrative costs which will be incurred in the management, control and enforcement of the general authorisation scheme and of rights of use and of specific obligations ...*, which may include costs for international cooperation, harmonisation and

based on the contribution of rather small markets, and where one would thus expect the contribution rate to be higher. Second, the limitations on administrative charges established by Article 12 AuD seem reasonable. Third, the Commission already has sufficient authority to investigate any well-founded complaints that administrative charges are set at levels in excess of the levels authorised in Article 12 AuD, and to initiate infringement proceedings if warranted.

3.3.3.2 Competitive asymmetry if non-ECS OTT services can enter the market without a Notification

As regards asymmetries between ECS and non-ECS OTT services, multiple approaches are possible. One approach that has been advocated by some stakeholders would be to expand the definition of Electronic Communication Services (ECS) to include all OTT services (or alternatively to include all OTT services that compete with ECS, or all OTT services that use numbering resources), and to impose obligations identical to those to which traditional ECS providers are subject. For reasons which we sketched out in Section 1.5, we are strongly of the view that a more nuanced approach is required, considering individual obligations and imposing only those that are relevant to a particular service, and only in ways that are proportionate in light of the characteristics of that particular service.³⁹⁶ In any event, since such a redefinition would have impacts that ripple through the entire RFEC, and not just the substantive domains that we are examining, it is clearly out of scope for this study.

A more modest revision of the definition of ECS might be considered within the frame of the current project. BEREK and some market players have suggested that clarification of the definition of ECS may be in order, for instance in regard to the relevance of *conveyance of signals*, in order to mitigate divergent and inconsistent application by the NRAs and the courts.³⁹⁷ Again, any major redefinition would have to be made with care, since it would potentially impact provisions throughout the RFEC.

One could also consider a clarification at European level that OTT services that complete calls from or to E.164 numbers are, to the extent that they do so, ECS services. This is already the case in many Member States.³⁹⁸ There would be logic to a consistent rule, to the extent that OTT services that complete calls to E.164 numbers

standardisation, market analysis, monitoring compliance and other market control, as well as regulatory work involving preparation and enforcement of secondary legislation and administrative decisions, such as decisions on access and interconnection" (Art. 12 Authorisation Directive).

³⁹⁶ These views are in line with those of BEREK. See BEREK (2016), "Report on OTT services", BoR (16) 35, p. 38; and BEREK (2015), BEREK Opinion on the Review of the EU Electronic Communications Regulatory Framework, BoR (15) 206, p. 43: "Adjusting the ECS definition, as suggested in the ["Report on OTT services"], does not necessarily imply that all players that qualify as an ECS would be subject to the same rules (rights and obligations). Rather, it will be important to ensure that any rules that apply are necessary, proportionate and fair."

³⁹⁷ BEREK (2016), Report on OTT services, BoR (16) 35; and BEREK (2015), BEREK Opinion on the Review of the EU Electronic Communications Regulatory Framework, BoR (15) 206.

³⁹⁸ BEREK (2016), Report on OTT services, BoR (16) 35.

might be subject to obligations in regard to calls to the emergency number “112” and to interception for purposes of law enforcement.³⁹⁹

We have not identified any other need for non-ECS OTT service providers to file a Notification.

Candidate Action Line 3: Clarify the definition of Electronic Communication Services (ECS) in regard to the relevance of *conveyance of signals* and the use of E.164 numbers in the context of OTT services.

Finally, we note that while there is an entire Directive on *market entry*, there is no formal mechanism at European level for *market exit*. This does not mean that there is no mechanism at all – some Member States enable ECS to de-register using the same web site that they use for online Notification.⁴⁰⁰ This appears to have been a minimal concern to date. One might have expected delays when a firm wishes to exit the market, for instance, but we have come across no indications of that.

The absence of a consistent framework for market exit has, however, meant that there are no reliable statistics on the number of fixed and mobile ECS players in the market, since only market entry has been recorded (and even that has been recorded differently in each Member State). This could be an issue for monitoring the effectiveness of the RFEC going forward, for example if there were a need to monitor changes over time in the number of MVNOs in each Member State (see Sections 3.3.4 and 3.4.4).

3.3.4 Adapting candidate Action Lines to address different possible scenarios of market and technology evolution

In many of the thematic areas, we consider adaptations to the candidate Action Lines in response to Threats identified in the SWOT analysis (see Section 3.3.1); for market entry *per se*, however, no Threats are evident.

Challenges associated with OTT services are treated as a Weakness rather than a Threat, since they are already visible. As OTT services come to represent a progressively greater fraction of the total electronic communications environment (in terms of both usage and revenue), these issues grow in importance, but they do not fundamentally change. Changes to the candidate Action Lines change only to the extent that the need for them might become more urgent.

In Section 3.2.6, we expressed concerns that the net decline in the number of MNOs that was first observed in 2015 as a result of consolidation might turn out to be a

³⁹⁹ These regulatory obligations are not in scope for this study, but we mention them because they are relevant here.

⁴⁰⁰ France and Sweden, for example.

sustained trend rather than an anomaly. It is premature at present to say that this is a problem, and also premature to say exactly what should be done about it if it were. The implications for market entry in terms of the authorisation process would appear to be minimal. A progressive decline in the number of MNOs and/or MVNOs in Europe might, however, have implications for spectrum policy, both in terms of the urgency of releasing WAPECS spectrum to the market, and in terms of the need for MVNO arrangements.

It may consequently be appropriate to monitor these effects at European level, not only for MNOs but also for MVNOs. For MNOs, monitoring is relatively straightforward. For MVNOs, however, tracking changes over time in the competitive landscape is challenging. This might imply a need to track market entry and market exit of MVNOs going forward in order to have reliable data for monitoring the effectiveness of the RFEC going forward, and for triggering a possible response in regard to spectrum management policy.

3.4 Scarce resources: spectrum

As usual, we begin with a SWOT analysis, then proceed with an analysis of the Problem, a series of candidate Action Lines, and reflections on the implications of possible scenarios of market and technology evolution.

3.4.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework

Table 51: Strengths, weaknesses, opportunities and threats (SWOT): Spectrum management⁴⁰¹

	Positive	Negative
Current or predictable	<p>Strengths</p> <ol style="list-style-type: none"> 1. Good process is usually followed. 2. Assignment sometimes takes place quickly. 3. Roles and responsibilities are reasonably well defined. <ul style="list-style-type: none"> ○ The Commission's coordinating role (e.g. with the RSPP) is clear. ○ The Commission has an explicit role relative to ITU and CEPT, and can issue mandates to CEPT. 4. National needs are often addressed well. 5. Most SMAs demonstrate strong competence and have good knowledge of national circumstances. <ul style="list-style-type: none"> • Technological improvements and policy innovation enable progressively better use of spectrum assets. • Market mechanisms (auctions) are widely used for award of rights to use spectrum for WAPECS. 	<p>Weaknesses</p> <ol style="list-style-type: none"> 1. Flawed process (e.g. demonstrably incorrect auction design, inappropriately high reserve prices) is occasionally followed in Member State selection processes to award rights to use spectrum for WAPECS, leading to inefficient auction prices or assignments 2. Assignment often takes place slowly. Only 10 Member States met RSPP requirements to assign 800 MHz spectrum by 2012, and only 12 to assign 2600 MHz spectrum by 2012 3. Lack of a clear boundary between the roles of <i>politics</i> versus <i>regulation</i> in spectrum management. 4. Institutional arrangements do not ensure consistent outcomes. 5. Occasionally flawed auction designs suggest gaps in auction design knowledge on the part of some SMAs. <ul style="list-style-type: none"> • Secondary market mechanisms are in place in most Member States, but are rarely used for WAPECS spectrum.
Not fully predictable	<p>Opportunities</p> <ol style="list-style-type: none"> 1. Continued overall progress in technology. 2. Mechanisms evolve that identify and correct obvious flaws at Member State level, and that achieve scale economies and enhanced consistency while responding properly to local circumstances. <ul style="list-style-type: none"> ○ Reforms to review and ameliorate auctions designs that are clearly flawed. ○ Reforms to reduce the risk of inappropriate financial targets for auctions. • Reforms make secondary markets function effectively. • Licence terms and renewal are set to reflect incentives for investment and trading. 	<p>Threats</p> <ol style="list-style-type: none"> 1. Technological progress slows (e.g. Moore's Law loses effect). The effect on spectrum demand is ambiguous, since this is likely to lead both to a slowing in traffic growth and a slowing in improvements in data compression. 2. Flaws in process may not be addressed, and continue to lead to flaws in outcome in some Member States (e.g. demonstrably incorrect auction design, inappropriately high reserve prices). Lack of consistency in outcomes persists. <ul style="list-style-type: none"> • Delays⁴⁰² in assignment are experienced with 700 MHz (as with 800 MHz).

Source: WIK Consult.

⁴⁰¹ Where a Strength and a Weakness are opposite sides of the same coin, we have assigned the same sequence number to both; otherwise, we do not provide a sequence number.

⁴⁰² Delays relative to whatever dates are ultimately established in some Decision that will presumably flow from the Commission proposal for a Decision of the European Parliament and of the Council on the use of the 470-790 MHz frequency band in the Union (COM(2016) 43, 2.2.2016).

3.4.2 Problem definition and problem drivers

Once again, the definition of the Problem flows directly from the Weaknesses identified in the SWOT analysis (see Section 3.4.1). The Opportunities are reflected in the candidate Action Lines (see Section 3.4.3) used to address the elements of the Problem. A discussion of how the candidate Action Lines might need to be adapted to meet the Threats appears in Section 3.4.4.

The Weaknesses identified are:

- Flawed process (e.g. demonstrably incorrect auction design, inappropriately high reserve prices) is occasionally followed in Member State selection processes to award rights to use spectrum for WAPECS (Section 3.4.2.1).
- Assignment often takes place slowly (Section 3.4.2.2).
- Lack of a clear boundary between the roles of politics versus regulation in spectrum management (Section 3.4.2.3).
- Institutional arrangements do not ensure consistent outcomes (Section 3.4.2.4).
- Occasional flawed auction designs suggest gaps in auction design knowledge on the part of some SMAs (Section 3.4.2.5).
- Secondary market mechanisms are in place in most Member States, but are rarely used for WAPECS spectrum (Section 3.4.2.6).

We consider these issues in turn in the sub-sections that follow.

3.4.2.1 Flawed process is occasionally followed in Member State selection processes to award rights to use spectrum for WAPECS

Good process is generally followed, but there are noteworthy exceptions. In Section 2.2.3.2, we identified isolated instances of apparently poor practices in Member State spectrum assignment. Desk research and stakeholder interviews suggest a number of instances of flawed award procedures, such as setting reserve prices too high in order to fill budget gaps in the Member State in question, or auction designs that had obvious defects.

For example, the Polish auction has been widely criticised criticised for a lack of bidder pre-qualification, and for allowing the withdrawal of bids after they have been made (see Section 2.2.3.2.3). That the normalised price per MHz/pop for 800 MHz WAPECS spectrum is high in Poland in comparison to that in other Member State auctions might support the concerns that have been expressed over flawed process leading to inflated auction prices (see Section 2.2.3.2.3).

Meanwhile, the French 700 MHz auction reflects an apparently excessive reserve price (three times higher than that in Germany). MNO stakeholders also complained about reserve prices in Hungary and Greece.

MNO stakeholders raised plausible concerns about various other apparent process defects, including a change in the transparency rule in the Austrian 800 MHz auction after high price levels had already been reached, which suggests that the initial auction rules might not have been set appropriately (see Section 2.2.3.2.3).

Some of these may reflect gaps in the skill sets of those designing auctions (see Section 3.4.2.5); others may suggest conflicting incentives on the part of the Member State making the assignments (see Section 3.4.2.3); still others may reflect failings in institutional design either within the Member State in question, or else gaps in the ability of the European institutions to ensure outcomes that are positive and consistent (see Section 3.4.2.3). We take each of these up in the sections that follow, and also in the Action Lines in Section 3.8.3.

3.4.2.2 Assignment often takes place slowly

Assignment sometimes take place promptly, but often takes place slowly. Our primary concern here is with the WAPECS bands that are used to provide ECS.

Reiterating the concerns expressed in Section 2.2.3.2.1, delays in assignment of 800 MHz and 2.6 GHz spectrum impacted the efficiency of network operators. Delays in assignment were a general problem in most Member States (not all), but they were much worse in some Member States than in others. The delays in assignment prevented network operators from migrating to more efficient technology, for instance, and obliged them to deploy more cell sites than would have been needed if more desirable spectrum resources had been available.

Relative to Europe's interests in achieving widespread fast broadband as expressed in the broadband objectives of the Digital Agenda for Europe,⁴⁰³ these delays are clearly problematic. Our analysis makes clear that Member States that assigned 800 MHz early (e.g. 2010 to 2012) have significantly higher LTE coverage than those that assigned 800 MHz spectrum later (see Section 2.2.3.2.1, especially Figure 8).

As a second and related effect, MNOs in front-runner Member States were effectively penalised by practices in laggard Member States. MNOs in countries such as Germany that assigned 800 MHz spectrum promptly informed us that they were limited in their ability to deploy due to the risk of cross-border interference from services in neighbouring countries that were slow to assign 800 MHz spectrum.

⁴⁰³ European Commission (2010), A Digital Agenda for Europe, COM(2010)245, Brussels, 19.5. 2010.

The significance of these very substantial delays and resulting gaps between first and last movers cannot be over-stated. Spectrum delayed is spectrum denied.⁴⁰⁴ Potential efficiencies are foregone. Huge delays for 800 MHz and 2,6 GHz spectrum, together with time gaps before all Member States have assigned the same band, prevented equipment manufacturers, as well as operators and their customers, from fully benefiting from economies of scale.

In a 2009 paper, Hazlett and Muñoz sought to quantify these effects.⁴⁰⁵ In general, delays in the release of spectrum to the market can be expected to produce two main effects:

- Each release of spectrum to the market improves the efficiency of the networks that use it, thus lowering their costs.
 - In a competitive market, the networks will compete away most or all of these gains, thus benefitting consumers through lower prices.
 - Consumers will tend to respond to lower prices by consuming more thanks to the *price elasticity of demand*.
- A release of spectrum to the market may enable another market player to achieve entry, thus generating significantly greater societal gains.

Hazlett and Muñoz used a fixed effects panel data estimation, based on Merrill Lynch data on service-based revenue per minute of use, albeit regrettably with older data from 1999-2003. It is a sophisticated and thoughtful analysis that enabled them to develop regression coefficients that plausibly predict all of the main indicators of the impact on societal welfare, including transfer of surplus and reduction in deadweight loss.⁴⁰⁶

They used the model to analyse spectrum auctions in 2001 and 2002 where Greece and Belgium offered four blocks, but in each case attracted only the three incumbents. They thus failed to release the last block to the market, and also did not realise more revenue than the reserve price. These failures appear to represent poor auction design, rather than a mere lack of demand. The column labelled DCS1 in Figure 64 represents the loss of potential gains in societal welfare had the block gone to a new entrant; the column labelled DCS2 represents the smaller loss of potential gains in societal welfare in the absence of market entry (i.e. the efficiency gains that would have been realised

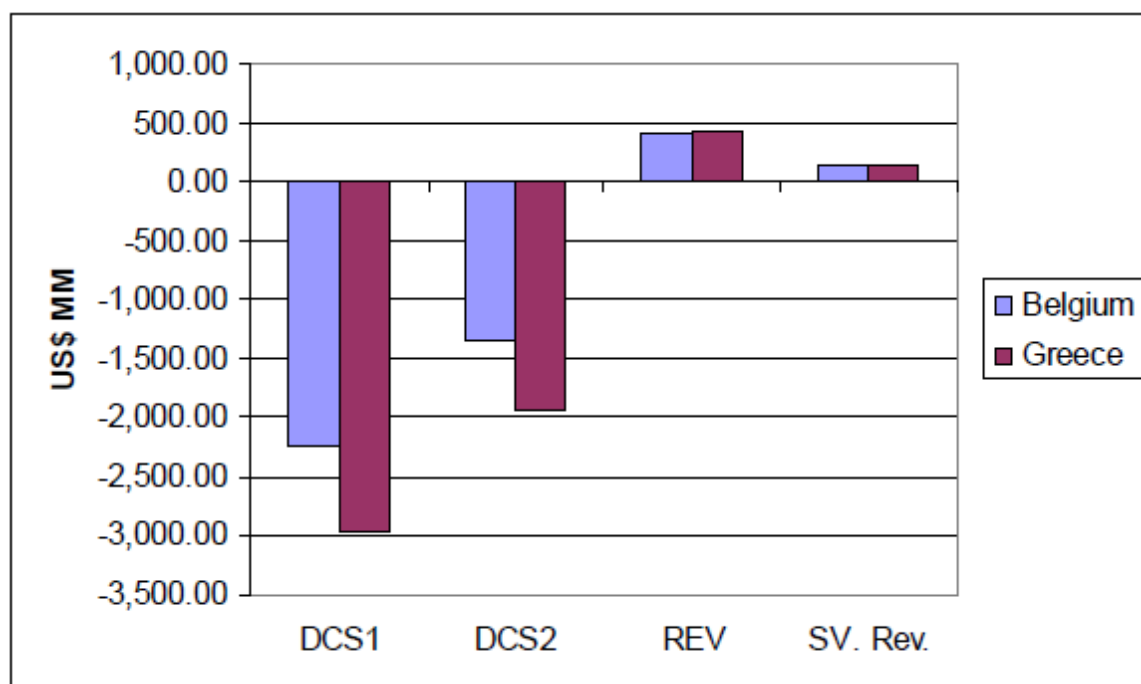
⁴⁰⁴ This is a paraphrase of the famous phrase attributed to UK Prime Minister William Gladstone: "*Justice delayed is justice denied*." Legal relief that comes too late is scarcely better than no relief at all.

⁴⁰⁵ Hazlett, T. W. and R. E. Muñoz (2009), A welfare analysis of spectrum allocation policies, *RAND Journal of Economics* 40(3) pp. 424-454.

⁴⁰⁶ "*The mark-up equation results suggest that the equilibrium price in the market increases with the Herfindahl-Hirschman Index but decreases with the amount of spectrum allocated to mobile services. These results are statistically significant, and are consistent with economic theory. It is expected that more competitive markets feature lower service prices, whereas expanded availability of radio spectrum lowers both fixed costs and variable operating expenses.*" *Ibid*.

had the block in question been assigned to an existing MNO, with no new market entry). The REV column represents the loss in government revenue to the block that was not sold. SVREV reflects their assumption that roughly one third of government revenues would have flowed back into societal gains.

Figure 64: Welfare effects of not issuing the fourth licence in Greece and in Belgium in 2001 (million USD)



Source: Hazlett and Muñoz (2009), "A welfare analysis of spectrum allocation policies", RAND Journal of Economics, 40(3), pp. 424-454.

A key observation is that the societal benefits of releasing spectrum to market will tend to greatly exceed the direct revenue realised by the government. This is consistent with the general principle that the rationale for auctioning spectrum is not to generate government revenue, but rather to ensure that spectrum promptly gets into the hands of the party that values it most and is therefore likely to use it most effectively (see Section 3.4.2.2).

The Hazlett and Muñoz analysis is rather old, and would be difficult or impossible to reproduce today. It was based solely on voice (not data), and would be difficult to repeat for today's bundled voice/data services (little data on revenue and volumes for mobile data traffic [as distinct from voice traffic] is available, and is not broken out by voice versus data); nonetheless, the results are suggestive and instructive.

3.4.2.3 Lack of a clear boundary between the roles of politics versus regulation in spectrum management

In many aspects of the RFEC, the respective roles of the NRA versus that of the relevant ministry or ministries are fairly clear. This is appropriate, inasmuch as the government might be tempted to introduce political or other considerations into a determination that ought appropriately to be objective, neutral, and transparent. The various provisions of Article 3 of the Framework Directive oblige Member States to “*guarantee the independence of national regulatory authorities*”, and to ensure that NRAs “*exercise their powers impartially, transparently and in a timely manner*.” These protections were substantially strengthened in the course of the 2009 revisions to the RFEC.

For spectrum management, the boundary between regulatory versus broader policy measures is not crisp. Article 9(1) of the Framework Directive obliges Member States to “*ensure that spectrum allocation used for electronic communications services and issuing general authorisations or individual rights of use of such radio frequencies by **competent national authorities** [emphasis added] are based on objective, transparent, non-discriminatory and proportionate criteria*.” A “competent national authority” is not necessarily an NRA, and thus is not necessarily subject to the provisions of Article 3 of the Framework Directive.

In practice, the relevant ministry often plays a large role in spectrum management policy. Whether this is appropriate, leaving aside the text of the RFEC and speaking in broad policy terms, depends on what specifically is to be determined.

As a general rule and in terms of general philosophy, it would appear that broad policy goals at Member State level are appropriately the responsibility of the government, and therefore subject to the political process (within any bounds established at European level). Detailed spectrum assignment procedures, however, are probably most appropriately determined by regulatory experts with the necessary training and focus, insulated as much as possible from political considerations.

In terms of determining the reserve price (and thus the target revenue) for a spectrum auction, for example, our sense is that mixing the government’s possibly short term need for revenue into the auction design often has perverse effects that are negative for the electronic communications sector. This view is consistent with the original literature that led to the preference for auctions over so-called “beauty contest” award procedures.⁴⁰⁷ The primary rationale for the auction was not to raise money, but rather to ensure that spectrum was assigned to whoever valued it most (and was therefore likely to use it most productively). The secondary rationale was that assignment through

⁴⁰⁷ Coase, R. (1959), *The Federal Communications Commission*, Vol. 2 (Oct., 1959), University of Chicago Press, pp. 1-40.

an auction was likely to be more efficient and less vulnerable to challenges and litigation than “beauty contest” assignment.

Beyond this, many technical aspects of an auction could appropriately be viewed as regulatory rather than policy or political decisions, including for instance the type of auction (e.g. SMRA versus CCA), and the size of frequency packages. Procompetitive aspects including for instance the use of spectrum caps or of set-asides seem once again to be appropriately viewed as regulatory aspects. We return to this discussion in Section 3.4.3.3.

There are many other aspects where government policy and political considerations at Member State level appear to play an altogether legitimate role in regard to spectrum management. There would appear to be a substantial government interest in military spectrum (beyond the NATO bands), for instance, although different Member States find a different balance between government and NRA competencies in this regard.

Drawing a crisp line between government policy considerations versus regulatory considerations would not be straightforward, but the current practice where all aspects of spectrum management are potentially subject to political considerations must nonetheless be viewed as a defect.

3.4.2.4 Institutional arrangements do not ensure consistent outcomes

Current arrangements provide the Member States with broad discretion in regard to spectrum management. This results in widely divergent outcomes. Depending on circumstances, however, divergent outcomes may or may not be problematic.

Substantial differences among the Member States are visible in (1) the format (*Simultaneous Multiple Round Auction (SMRA)* versus *Combinatorial Clock Auction (CCA)*) and details of any auctions that are used to make exclusive assignments (see Section 2.2.3.2.3); (2) the speed with which newly available bands are made available (see Section 2.2.3.2.1); (3) the duration of the licence (see Section 2.2.3.2.2); (4) coverage obligations (see Section 2.2.3.2.6); and (5) the approach to spectrum caps and MVNO obligations (see Sections 2.2.3.2.4 and 2.2.3.2.7), both of which relate to the state of competition in the market in question.

It is important to note that Article 8(5)(a) of the Framework Directive calls on NRAs to promote “regulatory predictability by ensuring a consistent regulatory approach”, but does not necessarily call for consistent outcomes. Indeed, the RFEC can be viewed as an attempt to achieve consistent process while recognising differences among the Member States. One can debate whether the differences in spectrum management outcomes among SMAs in the EU today (see Section 2.2.5) are too great, but the RFEC provides little concrete guidance against which this could be measured.

There are some aspects of spectrum management where consistency is clearly necessary, and this has been recognised to some extent in the current RFEC. As a conspicuous example, if each Member State had reached its own conclusions as to how and when to assign the 800 MHz spectrum that was freed by means of the Digital Dividend, there likely would have been widespread problems with cross-border interference between Member States permitting high power broadcasting from high towers near the border of other Member States seeking to use the same band for medium power WAPECS (mobile services). Concerns such as these are reflected in Article 8(a) of the Framework Directive, and in empowering the Commission to submit legislative proposals to establish multiannual radio spectrum policy programmes.

There are other aspects of spectrum management where Member State discretion can be efficient. As we note in Section 2.2.1.7.1, spectrum band allocations harmonised at European level are not invariably efficient, and spectrum allocations at Member State level are not invariably inefficient. Spectrum band harmonisation works best at a European level when there is a clear demand for new spectrum to be made available across all EU Member States for a particular service or application, and when the needs for spectrum for the application are not greatly different among the Member States. Where these conditions are not fulfilled, spectrum band harmonisation at European level may be inappropriate.

There are two forms of divergence that appear to be problematic. The first occurs when a need for consistent implementation was identified at European level, but was not consistently implemented at Member State level. The second relates to practice and outcomes that are not only divergent among the Member States, but also in certain respects clearly flawed. The delays in assignment of the 800 MHz band can be viewed as an example of the former, while the various auction defects identified in Section 2.2.3.2 are examples of the latter.

3.4.2.5 Occasional flawed auction designs suggest gaps in auction design knowledge on the part of some SMAs

Overall, the competence of SMAs appears to be high. A few of the apparent auction process errors, however, seem to suggest that there are gaps in the understanding of good auction practice on the part of a few SMAs. Examples include (1) lack of bidder pre-qualification, and allowing the withdrawal of bids after they have been made in the Polish auction; and (2) changes in transparency rules at an advanced stage of the Austrian auctions.

3.4.2.6 Secondary market mechanisms are in place in most Member States, but are rarely used for WAPECS spectrum

Spectrum trading or leasing, possibly in combination with change of use (collectively referred to as the use of *secondary markets* for radio spectrum resources) can serve to promote the efficient usage of spectrum by enabling a voluntary reassignment of inefficiently assigned spectrum user rights. Secondary markets can serve to correct for an inefficient auction result, or for changes over time that imply that a party holding spectrum rights is no longer the party best positioned to use them. Since the rights can in effect be transacted in a manner similar to a lease or a sale, the party holding the rights is constantly confronted with the opportunity cost associated with holding rights inefficiently versus selling or leasing them a party better equipped to make use of them.

Provisions for frequency trading are nominally in place in most Member States; nonetheless, the number of trades in most Member States is minimal. A significant number of trades have taken place in the United Kingdom and Sweden; however, most of these are of little limited commercial significance (see Section 2.2.3.3.1). As Ofcom⁴⁰⁸ points out, even though there have been over 13.000 spectrum trades in the UK in the past 10 years (equivalent to 2% of the stock of licences each year), the vast majority have dealt with fixed links / business radio (for instance, for taxis). There have, however, also been around 60 trades in the UK of high-value, block-assigned licences, with most of these being commercially driven deals between unrelated parties. The UK has also introduced the ability for holders of most block-assigned licences to lease their spectrum to third parties.

The causal drivers of the relatively greater use of spectrum trading in the UK and Sweden are not entirely clear, but it is likely that several factors contribute. That Sweden and the UK have the longest licence duration in the EU (24 years and indefinite, respectively) probably plays a positive role, as does the fact that these two Member States were among the first to establish a regime that permitted trading (in 2003 and 2004, respectively, as noted in Section 2.2.3.3.1). At the same time, the overall spectrum management regime in both Member States may possibly be more market-oriented and thus more conducive to trading than that in other Member States.

The root causes of the low number of trades overall are not entirely clear, given that mechanisms are generally in place. Possibly holders of WAPECS spectrum rarely perceive the need to conduct trades. The only clearly visible impediment that we have identified is that, in most Member States, little information is available on WAPECS holdings (see Section 2.2.3.3); thus, there is some burden (transaction cost) in obtaining the information that a given trade could be considered. Considering the value

408 OFCOM Response to Commission Public Consultation on the Review of the Regulatory Framework, December 2015, para. 53.

of a WAPECS band, one would however expect these transaction costs to be small by comparison.

3.4.3 Candidate Action Lines relevant to spectrum management

Our evidence base, including consultation responses, interviews, and data collected, indicate that spectrum management processes frequently function well; however, there are occasional serious lapses in some areas, and these merit attention.

Again, Action Lines seek to address or mitigate aspects of the Problem. The key Problem elements identified in regard to spectrum management are (see Section 3.4.3):

- Flawed process (e.g. demonstrably incorrect auction design, inappropriately high reserve prices) is occasionally followed in Member State selection processes to award rights to use spectrum for WAPECS (Section 3.4.3.1).
- Assignment often takes place slowly (Section 3.4.3.2).
- Lack of a clear boundary between the roles of politics versus regulation in spectrum management (Section 3.4.3.3).
- Institutional arrangements do not ensure consistent outcomes (Section 3.4.3.4).
- Occasional flawed auction designs suggest gaps in auction design knowledge on the part of some SMAs (Section 3.4.3.5).
- Secondary market mechanisms are in place in most Member States, but are rarely used for WAPECS spectrum (Section 3.4.3.6).

These problem elements are intertwined. The root causes of occasional lapses in the assignment process in some Member States assignment appear to include:

- Insufficient staff competence (e.g. lack of detailed understanding of spectrum auction design principles) on the part of some SMAs;
- Conflicts of interest between overall government goals and spectrum management goals;
- Where Member State assignment of (WAPECS) spectrum is unjustifiably delayed, corrective action on the part of European bodies comes too late; and
- Absence of objective and substantively meaningful external review or oversight of Member State actions.

3.4.3.1 Flawed process is occasionally followed in Member State selection processes to award rights to use spectrum for WAPECS

This Problem element is closely linked first to a lack of independent review of Member State actions, and second to lack of knowledge (for instance, of auction procedures) on the part of SMAs in some Member States. The candidate Action Lines that we put forward appear in Sections 3.4.3.3 and 3.4.3.5, respectively.

3.4.3.2 Assignment often takes place slowly

In regard to unjustifiable delays in the assignment of (WAPECS) spectrum, for cases where the delay is not caused by factors beyond the control of the SMA in question, the Commission already possesses substantial authority to enact Decisions and to launch infringement proceedings.⁴⁰⁹ It is normally not possible to launch infringement proceedings, however, until the assignment is already delayed past the target date. The proceedings then take time to work their way through the system.

One possible mitigating measure would be for the Commission, in future spectrum Decisions that entail release of WAPECS spectrum to the market, to identify one or two milestones prior to the eventual assignment of the spectrum (for example, the date on which a consultation for an auction design is launched, or the date on which a selection process is completed). An infringement proceeding could be initiated based on a missed milestone, well in advance of the eventual missed date for assigning the spectrum.

The Commission proposes to establish multiple successive deadlines in regard to the 700 MHz band.⁴¹⁰ This is a practice that may have more general applicability.

- *“By 30 June 2017, Member States shall adopt and make public their national plan and schedule (‘national roadmap’) for fulfilling their obligations under Articles 1 and 4 of this Decision.” (Art. 5)*
- *“Member States shall by 31 December 2017 conclude all necessary cross-border frequency coordination agreements within the Union.” (Art. 1.4)*
- *“By 30 June 2020, Member States shall allow the use of the 694-790 MHz frequency band for terrestrial systems capable of providing wireless broadband*

⁴⁰⁹ Infringement proceedings can be time-consuming; however, much work has been done in recent years to accelerate (or bypass) the process, including the widespread use of the Pilot process. See European Commission (2016), Single Market Scoreboard, Infringements (http://ec.europa.eu/internal_market/scoreboard/performance_by_governance_tool/infringements/index_en.htm): “The current report shows a significant decrease in the number of infringement proceedings (2% within the last six months). This is in line with the overall reduction of cases since systems to solve problems early were put in place. For example, cases have gone down by 44% since the EU-Pilot was launched in April 2008, initially with the participation of 15 Member States.”

⁴¹⁰ Commission proposal for a Decision of the European Parliament and of the Council on the use of the 470-790 MHz frequency band in the Union (COM(2016) 43 2.2.2016).

electronic communications services only under harmonised technical conditions set by the Commission.” (Art. 1(1))

- *“By 30 June 2022, Member States shall allow the transfer or leasing of the rights of use of spectrum for electronic communications services in the 694-790 MHz frequency band.” (Art. 2).*

The same approach could potentially be applied to other harmonised bands where there is an interest in prompt release of spectrum by the Member States.

Candidate Action Line 4: In future Decisions that oblige Member States to release WAPECs spectrum to the market, the Commission would also identify meaningful milestones, and might where appropriate launch infringement proceedings as soon as a milestone is missed.

3.4.3.3 Lack of a clear boundary between the roles of politics versus regulation in spectrum management

Addressing conflicts of interest between overall government goals and spectrum management goals would be more challenging. The most natural and comprehensive overall approach would entail several interrelated actions: (1) rigorously identifying those aspects of spectrum management that are best addressed as objective, regulatory matters, rather than political or policy decisions (a prominent example being the setting of the reserve price); (2) revising the Framework Directive so as to ensure that the regulatory aspects of spectrum management are assigned to an NRA, and thus benefit from the provisions of Article 3(3) of the Framework Directive that seek to ensure the independence of NRAs.⁴¹¹ This should include the Article 3(3)(a) provisions that Member States “ensure that national regulatory authorities have adequate financial and human resources to carry out the task assigned to them”, as well as the Article 3(3)(a) provision that NRAs “shall act independently and shall not seek or take instructions from any other body in relation to the exercise of these tasks assigned to them”, including the setting of the reserve price.

As we noted in Section 3.4.2.3, a clear delineation of the boundary between policy and regulation is challenging. We believe that some form of cooperation between the RSPG and Commission will be required in order to come to a sensible resolution. The setting of the reserve price represents a clear case of conflict of interest, where the government’s desire to raise as much money as possible is at odds with allocative efficiency of radio spectrum; consequently, the argument for treating it as a purely objective regulatory decision is strong. Additional candidates for purely regulatory

⁴¹¹ The Article obliges Member States to “*guarantee the independence of national regulatory authorities*”, and to ensure that NRAs “*exercise their powers impartially, transparently and in a timely manner.*” The Article seeks in many ways to ensure that this is the case.

decisions in the assignment process include the type of auction (e.g. SMRA versus CCA); the size of frequency packages; eligibility criteria; assignment conditions and parameters for defining coverage obligations; procompetitive measures such as spectrum caps or set-asides; and transparency rules.

We say that regulatory aspects of spectrum management would, under this Action Line, be assigned to “an NRA”, not to “the NRA”. There is nothing in the current RFEC that prevents Member State from granting different regulatory tasks to different NRAs, and we see no conceptual need to introduce such a restriction going forward. It is important that regulatory aspects of spectrum management be insulated from political considerations, but it does not seem to be crucial that all regulatory decisions be undertaken by the same body. Member State discretion would appear to be appropriate.

This Action Line has to be viewed as being somewhat radical, but the logic seems clear.

Candidate Action Line 5: The Commission should identify (with advice from the RSPG) those aspects of spectrum management that should appropriately be viewed as regulatory tasks, independent of Member State policy considerations. The Commission would put forward legislative proposals that would ensure that those aspects of spectrum management are undertaken by an NRA.

A more modest approach that could be considered would be to amend the current Directives so as to address the most serious problem in this space, which is the setting of inappropriately high reserve prices in spectrum auctions. Low reserve prices are arguably less problematic than high ones (an exception being scenarios where a high degree of tacit collusion between bidders is likely). As explained in Section 3.4.2.3, the primary goal of spectrum assignment should be to ensure that spectrum is assigned to whoever values it most, and will thus use it most effectively. Raising revenue is a by-product of the assignment process.

One could consider limiting the reserve price. The reserve price should be at least high enough to cover the cost of running the assignment process (e.g. an auction). This could be expressed using language similar to that of Article 12 of the Authorisation Directive, which limits administrative charges to levels needed to cover the Authorisation process.

Some would argue that there should be a somewhat higher reserve price in cases where there is a risk of tacit collusion among the bidders, since otherwise the auction might well conclude at the reserve price; one could alternatively argue that this is an allocatively efficient outcome to the extent that all blocks are assigned to parties that desire them, and will use them. Even in this case, it is clear that the reserve price should be less than the market value of the spectrum assignment in question – in fact, it should be sufficiently below the market value to leave some room for price discovery.

Limiting the reserve price may not be sufficient in and of itself to avoid inappropriately high prices. There are many ways for Member State authorities to create artificial scarcity in order to drive up the price of spectrum, some of which may be difficult to anticipate. A Member State could for example use set-asides to restrict the available spectrum to other bidders, or could intentionally delay the auction of some bands, or could so structure the auction as to make it probable that there will be fewer winners than the number of highly motivated bidders. These tricks are rarely used in Europe today because the setting of the reserve price is simpler, and gives the SMA a more direct control over the price received at auction.

An amendment to the Framework Directive could be considered, perhaps as a new paragraph in Article 9. A harmonising decision or recommendation under Article 19 of the Framework Directive might represent an alternative means of achieving a similar effect. There are also implications for Articles 7 and 13 of the Authorisation Directive.

Candidate Action Line 6: Consider revising the Framework and Authorisation Directives to establish criteria for the reserve price for any auction in order to avoid inappropriately high prices for exclusive assignment of radio spectrum and to ensure that the final fee charged will encourage optimal use.

3.4.3.4 Institutional arrangements do not ensure consistent outcomes

The absence of objective and substantively meaningful external review or oversight of Member State actions is a serious and fundamental problem in our judgment. Where there is bad process, either there is scant possibility for redress, or else the redress comes much too late to be useful. This is in sharp distinction to the situation for many other aspects of the RFEC, where the balance of competencies of the Commission and the Member States (as embodied, for instance, in the processes identified in Articles 7 and 7a of the Framework Directive) provides for a checks-and-balances process that helps to ensure that good practice is consistently followed.

If the will to change this is present, significant changes in institutional design would be required. Some form of rigorous peer review or oversight would need to be introduced.

With Candidate Action Line 10, the RSPG would introduce peer review of actions of proceedings voluntarily submitted by SMAs. This may serve a useful training function, but it clearly falls short as a mechanism to ensure consistent quality of spectrum management actions. SMAs are unlikely to voluntarily submit problematic decisions to peer review.

Any effective process would necessarily begin with a rigorous definition of the SMA actions that must be submitted for review.⁴¹² This process is closely related to the determination of which actions are regulatory versus policy matters that is put forward in Candidate Action Line 5, which we are treating as a prerequisite to this candidate Action Line.

A key question is, who would conduct such a peer review or oversight function? Multiple answers are possible. Candidates for this review function (which in this case are mutually exclusive) include:

- the RSPG, suitably enhanced, possibly in conjunction with the Commission;
- BEREC, suitably enhanced, possibly in conjunction with the Commission, and possibly with advice from the RSPG;
- some new organisation, possibly in conjunction with the Commission;
- the Commission alone, possibly with advice from the RSPG; or
- as a more radical option, the Commission might assume the duties currently vested in the SMAs, presumably subject to comitology procedure.

Vesting this responsibility in the RSPG has the advantage that the RSPG already exists, and already possesses the necessary expertise; however, the RSPG does not have the necessary legal competencies at present, and it arguably might also be subject to conflicts of interest if it were to undertake such a role. RSPG members represent their respective Member State governments, and cannot assumed to be neutral and objective in their decisionmaking. Decoupling regulatory policy aspects from regulatory aspects, as called for in Candidate Action Line 5, would appear to be a necessary prerequisite to the RSPG taking on such a role. Beyond this, it would be necessary to enact some legislative instrument that transforms the RSPG in much the same way in which the ERG was transformed into BEREC – it would need staff, a budget, and an institutional structure suitable to a much more operational role than it has at present. Either Articles 7 and 7a would need to be enhanced to address spectrum management actions, or else new text similar to Articles 7 and 7a but relevant to spectrum management decisions would need to be introduced (presumably into the Framework Directive). Under this candidate Action Line, the Commission could optionally play much the same role that it plays with BEREC today.

Vesting this responsibility in BEREC, by contrast, has the advantage that BEREC already exists, and already possesses the necessary legal competencies; however, BEREC does not have the necessary subject matter expertise at present (or rather, its

⁴¹² This definition would be roughly analogous to Art. 7(3) Framework Directive, which identifies the circumstances under which a draft measure must be made “accessible to the Commission, BEREC, and the national regulatory authorities in other Member States, at the same time, together with the reasoning on which the measure is based ...”.

members do not necessarily have the appropriate subject matter knowledge in all Member States). In other words, BEREC's strengths and weaknesses today are to some extent a mirror image of those of the RSPG.

This is not to say that BEREC could not grow into the role. Many of BEREC's member NRAs already have spectrum management responsibilities. Current BEREC participants already have extensive expertise regarding market regulation and competitive assessment, and BEREC is already entrusted with market regulatory functions. For BEREC to take on board the regulatory aspects of spectrum assignments is not that great a leap.

There could also be synergies with Candidate Action Line 5, which we view as prerequisite to this candidate Action Line. BEREC's members are NRAs. SMAs are not necessarily NRAs today; however, if Candidate Action Line 5 were implemented, certain spectrum management responsibilities would be handled by an NRA in every Member State, in which case BEREC could be expected to have participants with spectrum management competence from all Member States.

Expanding BEREC's role might possibly also improve its operational efficiency. Experience with the decentralised European agencies has demonstrated that small agencies suffer from inefficiency (in the form of a high ratio of administrative staff to total staff), since the (fixed) bureaucratic overhead imposed by being a Commission entity are carried by a small entity.⁴¹³

One might conceivably entrust the review and oversight responsibility to some new entity, rather than to the RSPG or to BEREC; however, this raises questions as to what the relationship of the new entity would be to the RSPG, the RSC, BEREC, and the Commission.

The Commission alone might undertake a review and oversight function. This is roughly equivalent to the situation that existed in regard to market definition and SMP determination prior to 2009, which worked reasonably well in many respects.

Candidate Action Line 7: Entrusting certain spectrum management actions (those related to market and economic regulation) to independent regulators as put forward in Candidate Action Line 5 and introducing a review and oversight role to a independent body at EU level could be considered as a means of ensuring better and more consistent spectrum management process among the Member States. Options as to which entity at European level might undertake such a role include: (1) the RSPG, suitably enhanced (much as ERG was transformed into BEREC), possibly in conjunction with the Commission; (2) BEREC, suitably enhanced, possibly in conjunction with the Commission; (3) some new organisation, possibly in conjunction with the Commission; (4) or the Commission alone.

⁴¹³ Ramboll et al. (2009), Evaluation of the EU decentralised agencies in 2009, p. 7, (http://ec.europa.eu/dgs/secretariat_general/evaluation/docs/decentralised_agencies_2009_part1_en.pdf).

It might be appropriate in conjunction with this candidate Action Line to grant the Commission implementing powers to set criteria for assignment rules or for conditions attached to rights of use that can impact the market and the outcome of auctions. This would provide objective standards that could serve to guide the review and oversight function.

As a more radical alternative, the Commission could itself assume many of the competencies currently held by the Member State SMAs, as has occasionally been proposed. Under this candidate Action Line, the Commission would not merely oversee Member State SMA functions, but would undertake them itself. We include this possibility for completeness of the analysis, but it may be problematic, and raises concerns in terms of the principle of subsidiarity.⁴¹⁴ Not only are there numerous practical obstacles, but it also does not in and of itself address the root problem, which is ensuring that spectrum management decisions are objectively and independently reviewed.

Candidate Action Line 8: As a more radical means of ensuring more consistent spectrum management process among the Member States, the Commission might assume many of the duties currently vested in the SMAs, presumably subject to comitology procedure.

3.4.3.5 Occasional flawed auction designs suggest gaps in auction design knowledge on the part of some SMAs

That spectrum management arrangements work well most of the time suggests that the overall staff competence of SMA personnel is good, and this is also our impression. A handful of flawed auction practices appear, however, to represent departures from best practice that competent, experienced staff should not have made.

A first and obvious Action Line would be to take action at European level to ensure that high quality training is widely available to SMA staff. It is not entirely clear which European entity should take responsibility for this. BEREC has been doing much the same for NRA staff for the past few years.⁴¹⁵ The RSPG would be an obvious candidate inasmuch as it has the corresponding subject matter expertise, but it serves only as an advisory body to the Commission. The RSPG does not appear to have the organisational competencies at present to procure and pay for training.

⁴¹⁴ Consistent with Better Regulation principles, we “do not discard a priori options with little support or facing strong opposition”.

⁴¹⁵ BEREC (2016), Call for tenders: Training on the Regulatory Framework for Electronic Communications Networks and Services and Other Topics Related to BEREC Activities: Technical Specifications, N 2016-BEREC-OT-01. The course material was intended to be comprehensive, but only a short optional block is provided on spectrum management, and even the optional material does not include auction design.

Candidate Action Line 9: Ensure that high quality training is widely available to SMA staff.

A second possible mechanism for enhancing staff competence would be for experts to provide assessment and peer review of various actions taken by Member State SMAs, and to make these available to the SMAs (and ideally also to the general public). This role is entirely compatible with the mission of the RSPG, and the RSPG is actively considering it⁴¹⁶ (possibly in response to the ongoing review of the RFEC). The RSPG's deliberations assume that SMAs would voluntarily submit specific actions of proceedings for peer review with a view to seek practical support and advice from peers.

Voluntary submission is consistent with a training role, but not with an oversight role – it is unlikely that the SMA actions most likely to raise concerns would be voluntarily submitted for review. Aside from that, the members of the RSPG as presently constituted are Member State governments, not necessarily NRAs; thus, their impartiality is not assured.

Candidate Action Line 10: The RSPG should conduct peer review of actions voluntarily submitted by the SMAs, in order to provide case studies that demonstrate best practice and to provide practical support at technical level.

3.4.3.6 Secondary market mechanisms are in place in most Member States, but are rarely used for WAPECS spectrum

Since 2002, trades have occurred in the WAPECS bands, and have thus enabled an efficient reallocation of spectrum user rights; however, trades of ECS spectrum have been rare in practice, except in cases of mergers or insolvency (see Sections 2.2.3.3 and 3.4.2.6).

In most Member States, trading is permitted, and there are no obvious deficiencies in the arrangements for trading (other than the lack of a comprehensive public register in many Member States). The root causes for the lack of trades are thus not obvious.

The lack (see Section 2.2.3.3) of a comprehensive and transparent public register in some Member States should be viewed as an institutional deficiency. This could be corrected either by European action (for instance, inclusion in a Directive) or by action on the part of the Member States. There is no obvious requirement for a single

⁴¹⁶ RSPG (2016), Chairman's Report of RSPG#40 on 08 June 2016, RSPG16-030, Brussels, 8 June 2016. The RSPG committed itself to “develop a proposal for Peer Review focused on spectrum awards, to take forward the best practice identified by the recent Report on Awards, into a practical programme through which members can learn from and support each other ...”

database for all Member States; however, there are obvious advantages if records are maintained consistently in terms of ease of use for market players (which is the key goal of such a register).

Correcting this would appear to be positive, but would not necessarily in and of itself lead to a large number of significant spectrum trades.

Candidate Action Line 11: Consider making a legislative proposal that would require Member States to maintain a transparent public register of spectrum bands and locations that could potentially be available for trading, together with contact information for the licence holder.

3.4.4 Adapting candidate Action Lines to address different possible scenarios of market and technology evolution

In Section 2.2.5.3.1, we expressed concerns that the net decline in the number of MNOs that was first observed in 2015 as a result of consolidation might turn out to be a sustained trend rather than an anomaly. It is premature at present to say that this is a problem, and also premature to say if anything should be done about it if it were. It may be appropriate, however, to monitor these effects at European level, not only for MNOs but also for MVNOs.

This is primarily a competition concern, but it has implications for spectrum management inasmuch as (1) release of spectrum to the market and (2) introduction of competition on the part of MVNOs are the main public policy instruments for counteracting any negative impact of consolidation.

For MNOs, monitoring is relatively straightforward, since MNOs require spectrum assignments that are a matter of public record. Also, market shares in terms of subscribers and in terms of revenues are available from various commercial sources. For MVNOs, tracking changes over time in the competitive landscape is challenging. This has implications for the data that should be used to monitor the effectiveness of the RFEC going forward.

Many of the greatest challenges to European policy in regard to spectrum management relate to the assignment of competencies between European versus Member State agencies. We emphasise that centralisation of authority at European level is not the right answer to every problem; however, there are some aspects of European spectrum management where selected shifts of competence either to the Union or to bodies representing multiple Member States (e.g. the RSPG or BEREC) merit serious consideration (as is visible in the candidate Action Lines in Section 3.4.3). Public

acceptance of transfer of competence from Member States to the Union appears however to be lower than in previous years.⁴¹⁷ This may raise practical barriers to the implementation of some of the solutions that would appear in the abstract to be most promising.

3.5 Scarce resources: numbers

As with each of thematic areas previously covered, we begin with a SWOT analysis, then proceed with an analysis of the Problem, a series of candidate Action Lines, and reflections on the implications of possible scenarios of market and technology evolution.

⁴¹⁷ Pew Research Center (2016), "Euroskepticism Beyond Brexit: Significant opposition in key European countries to an ever closer EU", based on a survey conducted in 10 EU Member States among 10,491 respondents from April 4 to May 12, 2016, (<http://www.pewglobal.org/2016/06/07/euroskepticism-beyond-brexite/>, viewed 14 June 2016).

3.5.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework

Table 52: Strengths, weaknesses, opportunities and threats (SWOT): Numbers⁴¹⁸

	Positive	Negative
Current or predictable	<p>Strengths</p> <ol style="list-style-type: none"> 1. Numbering rules and policies for traditional services are fairly clear. • The Commission has an explicit coordinating role relative to the Member States in Art. 10(5) FWD. • NRAs have good knowledge of national circumstances, and address national needs well. • Voice and SMS telephony is for the most part not putting pressure on existing national E.164 numbering plans. 	<p>Weaknesses</p> <ol style="list-style-type: none"> 1. Numbering rules and policies for newer services such as VoIP and Machine-to-Machine (M2M) communications are often unclear. • There are practical limitations to the Commission's ability to promote EU interests in international bodies such as the ITU and CEPT. • The <i>European Telephony Numbering Space (ETNS)</i> is now inoperative. • <i>Temporary</i> use of E.164 numbers outside of the country that issued them is universally accepted (e.g. roaming), but there are no clear standards for <i>long term or permanent</i> extra-territorial use of E.164 numbers.
Not fully predictable	<p>Opportunities</p> <ol style="list-style-type: none"> 1. Migration to eSim may mitigate the threat that network operators use the E.212 number in the SIM to lock in M2M providers. 2. As services are increasingly IP-based, there may be opportunities to use the enormous IPv6 addressing space instead of conventional E.164 numbers. This might alleviate concerns over number exhaustion. • A coherent, coordinated approach to extra-territorial use of E.164 numbers might serve not only to clear the way for a range of M2M applications that would otherwise be impaired, but might also clarify the overall approach to nomadic VoIP services. • Some alternative approach to a European numbering identity with international Freephone service might be attractive to European businesses and consumers. 	<p>Threats</p> <ol style="list-style-type: none"> 1. Providers of M2M services may face lock-in effects by network operators through the use of E.212 numbers in combination with the traditional SIM card approach. 2. Adoption of IPv6 may continue to be slow, posing challenges to use of IPv6 addresses as a replacement for E.164 numbers. • Changes in the way in which numbers are used is putting pressure on numbering plans. <ul style="list-style-type: none"> ○ If parties other than traditional network operators seek to issue SIMs, the MNC identifier (a portion of the E.212 IMSI that is just two digits in Europe) may come under pressure in some Member States. ○ Inability to use E.164 numbers long term on an extra-territorial basis would create practical impediments to cross-border M2M deployments, including connected cars.

Source: WIK Consult

⁴¹⁸ Where a Strength and a Weakness are opposite sides of the same coin, we have assigned the same sequence number to both; otherwise, we do not provide a sequence number.

3.5.2 Problem definition and problem drivers

As usual, the definition of the Problem flows directly from the Weaknesses identified in the SWOT analysis (see Section 3.5.1). Key Weaknesses are:

- Numbering rules and policies for newer services such as VoIP and Machine-to-Machine (M2M) communications are often unclear (Section 3.5.2.1).
- There are practical limitations to the Commission's ability to promote EU interests in international bodies such as the ITU and CEPT (Section 3.5.2.2).
- The *European Telephony Numbering Space (ETNS)* is now inoperative (Section 3.5.2.3).
- Temporary use of E.164 numbers outside of the country that issued them is universally accepted (e.g. roaming), but there are no clear standards for long term or permanent extra-territorial use of E.164 numbers (Section 3.5.2.4).

3.5.2.1 Numbering rules and policies for newer services are often unclear

Numbering rules and policies for traditional voice and SMS services are generally clear enough, but newer services such as VoIP and Machine-to-Machine (M2M) communications are sometimes unclear.

For VoIP services (especially *nomadic* VoIP services that are not tied to a single location), this problem has long been recognised.⁴¹⁹ Most Member States, but not all, treat VoIP services that can be used to place calls to E.164 numbers, as ECS (see Section 1.5). Assignment of geographic versus non-geographic numbers is not consistent (see again Section 2.3.4.1).

For Machine-to-Machine services, we treat this as a future rather than an immediate threat, and consider it further in Section 3.5.4.

3.5.2.2 There are practical limitations to the Commission's ability to promote EU interests

The RFEC gives the Commission substantial authority to coordinate national numbering decisions, but the powers in regard to crucial international bodies are fragmented. The Commission has explicit powers not only in Article 10 of the Framework Directive, but also in Article 19(3)(b) of the Framework Directive, which empowers the Commission "*where the Commission finds that divergences in the implementation by the national regulatory authorities of the regulatory tasks specified in this Directive and the Specific*

⁴¹⁹ See for instance ERG (2007), ERG Common Position on VoIP, ERG (07) 56rev2; and BEREC (2016), "Report on OTT services", BoR (16) 35, pages 16-17.

Directives may create a barrier to the internal market” to issue a recommendation or decision in order to further “a harmonised or coordinated approach for the purposes of addressing...” “... numbering, including number ranges, portability of numbers and identifiers, number and address translation systems, and access to 112 emergency services.”

For coordination of national decisions, Article 10(5) is exceedingly vague: *“Where this is appropriate in order to ensure full global interoperability of services, Member States shall coordinate their positions in international organisations and forums in which decisions are taken on issues relating to the numbering, naming and addressing of electronic communications networks and services.”* This text encourages Member States to coordinate with one another, but provides neither an operative coordination mechanism nor a mandate to the Commission or to any other European organisation.

Article 17(2) states that *“In the absence of ... standards and/or specifications, Member States shall encourage the implementation of international standards or recommendations adopted by the International Telecommunication Union (ITU), the European Conference of Postal and Telecommunications Administrations (CEPT), ...”* The focus is on adoption of standards, not on influencing them, and the provision is addressed only to the Member States. Article 17(1) of the Framework Directive empowers the Commission to *“request that standards be drawn up by the European standards organisations (European Committee for Standardisation (CEN), European Committee for Electrotechnical Standardisation (CENELEC), and European Telecommunications Standards Institute (ETSI))”*. Neither CEPT nor the ITU appears in this list. In regard to numbering, then, there is no explicit European authority to issue mandates to the CEPT. In practice, when it comes to European or global numbering standards, the European institutions do not have a seat of their own at the table.

All of this is in striking contrast to the situation for spectrum management standards, where the Commission has an explicit role with these same two organisations under Article 4 of the Radio Spectrum Decision.⁴²⁰ This Article specifically empowers the Commission, where appropriate and acting in concert with the Radio Spectrum Committee, to *“submit to the Radio Spectrum Committee ... appropriate technical implementing measures with a view to ensuring harmonised conditions for the availability and efficient use of radio spectrum, as well as the availability of information related to the use of radio spectrum”*. *“For the development of technical implementing measures ... which fall within the remit of the CEPT, such as the harmonisation of radio frequency allocation and of information availability, the Commission shall issue mandates to the CEPT, setting out the tasks to be performed and the timetable therefor”*. ... *“On the basis of the work completed ... the Commission shall decide*

⁴²⁰ European Parliament and Council (2002), Decision No 676/2002/EC of the European Parliament And of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision).

whether the results of the work carried out pursuant to the mandates shall apply in the Community and on the deadline for their implementation by the Member States.” “[If] the Commission or any Member State considers that the work carried out on the basis of a mandate ... is not progressing satisfactorily having regard to the set timetable or if the results of the mandate are not acceptable, the Commission may adopt ... measures to achieve the objectives of the mandate”.

The absence of explicit authority does not mean that there is no ability whatsoever for the Commission to intervene in the decision-making process of the ITU or CEPT, given that the province of these bodies concern competences shared between the EU and its Member States. Moreover the ‘principle of sincere cooperation’ (Art. 4(3) TEU) also known as ‘the duty of cooperation’), restrains Member States in their actions, and empowers the Commission to ask Member States to take positions in these international fora.

Despite the absence of detailed and explicit authority, COCOM issued instructions to EU Member States “who are also assignees of the 3883 code [to] take all necessary measures to ensure that 3883 is not reclaimed by the ITU. These Member States are strongly invited to adopt a firm common position in favour of retaining the code 3883 in the ITU SG2 meeting.” In a subsequent poll by the ERO, all but one of the Member States in question responded as requested, which is to say that nearly all reversed their previous positions in response to the COCOM request. In other words, the COCOM guidance appears to have had effect.

This being said, the practical means to implement cooperation in relation to the actions of the EU and its Member States in international organisations are not clear. “The [...] case law on the duty of co-operation and the Community’s experience with work in international organizations suggest that the principle’s effectiveness is limited if it is not fleshed out. There is an obvious case for basic legal rules on how to conduct co-operation in the framework of international organizations”.⁴²¹

3.5.2.3 The *European Telephony Numbering Space (ETNS)* is now inoperative

As recently as 2009, Parliament and Council enacted support for a European Telephone Numbering System (ETNS) in Articles 27(2) and 27(3) of the Universal Service Directive. The Commission’s 1996 Green Paper⁴²² makes clear that the original rationale for creating a European Telephony Numbering Space (ETNS) reflected (1) the belief that European firms desired these numbers, and (2) that the European institutions themselves desired that telephone numbers express a European identity.

⁴²¹ Jørgensen, K. D. and R. A. Wessel (2011), The position of the European Union in (other) international organizations: confronting legal and political approaches, in Panos Koutrakos, *European foreign policy*, Elgar, Cheltenham, 2011, p. 265.

⁴²² European Commission (1996), Towards a European Numbering Environment: Green Paper: On a Numbering Policy for Telecommunications Services In Europe, COM(96) 590, 20 November 1996.

The 2009 Universal Service Directive appears to still follow this line: “*Easy access to international telephone services is vital for European citizens and European businesses. ... The ITU has assigned, in accordance with ITU Recommendation E.164, code ‘3883’ to the European Telephony Numbering Space (ETNS).*”⁴²³ By 2009, however, serious questions should have been raised as to whether “European citizens and European businesses” truly had interest in this particular form of access to international telephone services. The ITU was already several years into the process of reclaiming code 3883 due to lack of deployment and lack of demand (see Section 2.3.1.5).

Be that as it may, the 2009 Universal Service Directive suggests that there is still interest among the European institutions in using numbers to express a European identity, much as has been done with European Internet top level domain (ccTLD) “.eu”. This therefore is appropriately part of the Problem definition. It is worth exploring whether some alternative approach to a European numbering identity might be attractive to European businesses and consumers, taking into account the numerous changes in the use of telephone numbers in recent years.

3.5.2.4 There are no clear standards for long term or permanent extra-territorial use of E.164 numbers

Just as with the regulatory classification of VoIP services (see Section 3.5.2.1), questions regarding the assignment and use of numbers in conjunction with *nomadic* VoIP services (i.e. services that are not mobile, but that may move from one fixed location to another) have been with us for many years.⁴²⁴ Indeed, the lack of clarity as regards extra-territorial use of E.164 numbers can be viewed as being an important special case of the more general problem of lack of clarity in the rules.

For nomadic VoIP, this is a recognised problem, but the consequences to date have been limited. Going forward, the growth in the Internet of Things (IoT) potentially raises concerns that are far greater. Equipment that is manufactured in one Member State, with SIM cards and numbers associated with that Member State, might be used in another Member State (or for that matter, anywhere in the world). Restrictions on the use of numbers might limit the ability of European manufacturers and users to benefit from the Internet of Things, especially in regard to devices that in their nature do not necessarily remain indefinitely in a single Member State (such as, for instance, connected cars).

⁴²³ See Recital 37 of the Universal Service Directive.

⁴²⁴ ERG (2007), ERG Common Position on VoIP, ERG (07) 56rev2; and BEREC (2016), “Report on OTT services”, BoR (16) 35, page 6: “[The] result of current regulation is a disharmonised allocation and use of geographic numbers, against the increasing demand amongst consumers to use geographic numbers out of area (nomadic use). In fact, some member states permit out of area use and allocation of geographic numbers while others do not. In addition the use of non-geographic numbers specifically allocated to VoIP services is an option but could not be the primary choice for the market.”

3.5.3 Candidate Action Lines relevant to numbers

Again, Action Lines seek to address or mitigate aspects of the Problem. The key Problem elements identified in regard to number management are (see Section 3.3.3):

- Numbering rules and policies for newer services such as VoIP and Machine-to-Machine (M2M) communications are often unclear (Section 3.5.3.1).
- There are practical limitations to the Commission's ability to promote EU interests in international bodies such as the ITU and CEPT (Section 3.5.3.2).
- The *European Telephony Numbering Space (ETNS)* is now inoperative (Section 3.5.3.3).
- Temporary use of E.164 numbers outside of the country that issued them is universally accepted (e.g. roaming), but there are no clear standards for long term or permanent extra-territorial use of E.164 numbers (Section 3.5.3.4).

3.5.3.1 Numbering rules and policies for newer services are often unclear

Clarification as to which OTT services should be regarded as ECS would appear to be in order, for reasons noted in Section 3.5.2.1. As noted in that section, most but not all Member States treat VoIP services that complete calls to or from E.164 numbers to be ECS. Harmonising this would reduce needless regulatory confusion and inconsistency.

Consideration might be given at the same time as to what kind of numbers are most suitable for what kind of OTT services: geographic, non-geographic, or VoIP-specific. These issues are also linked to concerns over extra-territorial use of E.164 numbers (see Section 3.5.3.4), but it is possible to resolve these issues without solving the more complex problem of extra-territorial use.

Since these issues were already addressed in Candidate Action Line 3, no further action is proposed here.

3.5.3.2 There are practical limitations to the Commission's ability to promote EU interests

As regards the practical limitations to the Commission's ability to promote EU interests, there is no obvious reason why the Commission should have less empowerment to protect European interests before the CEPT and ITU in regard to numbers than the Commission has to do the same in regard to spectrum. If there is interest in addressing this concern, the obvious response would be to take the existing operative text, notably

including Article 4 of the Radio Spectrum Decision,⁴²⁵ and enact similar text for numbering in some suitable legislative instrument. A possible location for the new text would be at the end of Article 10 of the Framework Directive.

Candidate Action Line 12: The Commission should propose changes in some legislative instrument that would empower the Commission to represent European interests before CEPT and the ITU in regard to numbering, much as the Commission does under Article 4 of the Radio Spectrum Decision. This might include a prerogative for the Commission to issue mandates to the CEPT.

3.5.3.3 The *European Telephony Numbering Space (ETNS)* is now inoperative

Europe is in a strange position as regards a European identity for numbers. Article 27(2) and 27(3) of the Universal Service Directive implement a European Telephony Numbering Service (ETNS) based on the ITU-assigned country code “3883”; however, the ITU subsequently withdrew the code due to alleged lack of use and lack of demand, and alleged violation of the conditions under which the code had been issued (see Section 2.3.1.5).

It is impossible to implement ETNS as initially intended without an international country code; for that matter, the original authorisation from the ITU to use “388x” was itself inconsistent with the intended use of ETNS.

Meanwhile, the (largely unrealised) design goals that initially generated interest in ETNS may still enjoy validity. The intent was to have a European Freephone service that would operate cross-border within the EU (or EEA), that would be free to the end-user placing the call, and that would also have a bounded and fair price to the firm providing the service.⁴²⁶ All of this would need to be implemented using numbers that appeal to end-users placing the calls, and therefore to firms that would offer the numbers. Technical implementation details would need to be such that network operators were not deterred by deployment costs. Implementation would need to be sufficiently widespread, and interconnection sufficiently robust, to make the service viable in the marketplace.

ETNS did not meet these goals, and it is not immediately clear how to structure a service that would. Any successor service would need to be based on a new and efficient technical design, and a realistic and hard-headed assessment of likely demand. If the service depends on an ITU country code, the ITU would need to assign the code. These are challenging requirements.

⁴²⁵ European Parliament and Council (2002), Decision No 676/2002/EC of the European Parliament And of the Council of 7 March 2002 on a regulatory framework for radio spectrum policy in the European Community (Radio Spectrum Decision).

⁴²⁶ Relative to the firm that provides an international Freephone service, by contrast, there is no price protection regarding the price that must be paid to the network operator providing the Freephone service.

Since the exact shape of a solution is not clear, the suggested Action Line merely notes in a Recital to the Universal Service Directive that a solution is still desired.

Candidate Action Line 13: Revise or delete Articles 27(2) and 27(3) of the Universal Service Directive in light of lack of availability of country code 3883. The Recitals of the Universal Service Directive might at the same time be amended to reflect continuing interest in a numbering solution that provides for a European numbering identity, and that appropriately meets some of the needs that ETNS historically sought to address

3.5.3.4 There are no clear standards for long term or permanent extra-territorial use of E.164 numbers

This is both a current problem (in regard primarily to nomadic VoIP), and a future problem (in regard to emerging IoT services). Since the impetus to resolve it comes primarily from future IoT services, we treat it primarily as a future consideration, and deal with it in Section 3.5.4.

3.5.4 Adapting candidate Action Lines to address different possible scenarios of market and technology evolution

The relevance of telephone numbers has gradually evolved over the years. Even twenty years ago, it was already the case that the telephone number served as an abstract means of locating a service, rather than merely identifying a particular port on a telephony switch. Today, with the increasing integration of Internet technology into telecommunication networks, and especially with the rapid growth of machine-to-machine (M2M) communications and of the Internet of Things (IoT), this tendency is further accelerating.

The growth of M2M and IoT has the potential to put stresses on telephone numbering plans, but the nature and severity of these stresses are still evolving and are not yet altogether clear. Some of these are potential challenges, others are still speculative, while still others are more immediate. Among the strains are:

- Growth in the number of connections for M2M communications is putting pressure on national E.164 numbering plans in some Member States.
- Temporary use of E.164 numbers outside of the country that issued them is universally accepted (e.g. roaming), but there are no clear standards for long term or permanent extra-territorial use of E.164 numbers (despite both existing demand for VoIP and emerging demand for M2M). Inability to use E.164

numbers long term on an extra-territorial basis could create practical impediments to M2M deployments, including connected cars.

- In Europe, the MNC identifier (a portion of the E.212 IMSI) is only two digits. If parties other than traditional network operators seek to issue SIMs (for instance, for IoT devices), the MNC identifier may come under pressure in some Member States.
- Providers of M2M services may face lock-in effects by network operators through the use of E.212 numbers in combination with the traditional SIM card approach. The use of eSIM (SIM that is programmable over the air) might solve this problem if and when eSIM deploys.
- IP addresses (and Internet domain names) might eventually replace E.164 numbers as identifiers; however, the IPv4 address space is already exhausted, and adoption of IPv6 may continue to be slow.

Among these issues, the extra-territorial use of E.164 numbers is perhaps the one most likely to cause problems within Europe. The issue has long been with us in regard to nomadic use of VoIP, but M2M applications such as connected cars raise concerns to new levels. A car sold in one Member State must be able to operate indefinitely in another, and should not be subject to (for instance) rules prohibiting permanent roaming. There appear to be efforts at national, regional and global level that are in some cases not coordinated. While the full extent of actions are not yet clear, nor whether they are most appropriately undertaken at Member State, European or global level, obstacles to extraterritorial use may impede the development of the M2M market and could also constitute an infringement of the fundamental freedoms enshrined in the treaties.

Monitoring these evolving trends seems to be called for, with particular emphasis on the extra-territorial use of E.164 numbers. In some cases, emerging problems should be fairly visible to national numbering authorities, for instance if E.164 numbers or E.212 MNC identifiers were to exhaust more rapidly than expected. Given the strong territorial scope of numbering regulation, and the inherent problems (with regard to cross border competence and enforcement), the appropriate response should also identify a European dimension to support the internal market and to enhance the efficiency of implementation.

Other potential problems would not necessarily be obvious for NRAs in quantitative numbering statistics, but might be important in a wider societal context. If for instance limitations in extra-territorial use of E.164 numbers were to result in less deployment of IoT services than might otherwise be expected, the resultant loss of societal welfare might not be immediately obvious to numbering authorities, nor would it necessarily be obvious in aggregate statistics. Those who manufacture equipment or provide services based on IoT are likely to be the first to identify any problems. If lock-in effects with the

SIM were to emerge, service providers would probably be the first to notice. In either case, further investigation would be needed to determine whether the complaints had a firm basis, and if so what policy intervention if any might be warranted.

3.6 Scarce resources: access to land

In this section, as with each section describing one of the thematic areas, we begin with a SWOT analysis, then follow with an analysis of the Problem, a series of candidate Action Lines, and reflections on the implications of possible scenarios of market and technology evolution.

3.6.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework

Table 53: Strengths, weaknesses, opportunities and threats (SWOT): Access to land⁴²⁷

		Positive	Negative
Current or predictable	Strengths	1. Access to land is managed at Member State, regional or municipal level by experts who know local conditions.	1. Because granting rights for access to land is highly decentralised, procedures are <i>extremely</i> diverse, and harmonisation at EU level extremely challenging. • The time from application to the start of network deployment is substantial and not fully predictable.
	Opportunities	• A 2014 Directive on measures to reduce the administrative cost of deploying high-speed electronic communications networks (the <i>Cost Reduction Directive</i> , or <i>CRD</i>) provides numerous mechanisms to better coordinate access to land and to streamline permit granting procedures, so as to reduce the time and the administrative costs associated with deployment of high-speed electronic communications networks. The CRD is not part of the RFEC, but it is a complementary measure that can be expected to have a substantial positive impact on the effectiveness of arrangements for access to install facilities. The effectiveness of the CRD cannot yet be determined because its implementation is delayed in most Member States. • Technological progress is bringing modest improvements in the cost-effectiveness of network deployment, even in regard to civil works.	• EMF rules in some Member States or municipalities are far more stringent than (non-binding) EU norms. This poses challenges for construction of wireless infrastructure.
Not fully predictable			

Source: WIK-Consult.

⁴²⁷ Where a Strength and a Weakness are opposite sides of the same coin, we have assigned the same sequence number to both; otherwise, we do not provide a sequence number.

3.6.2 Problem definition and problem drivers

The migration to fibre-based fast broadband and mobile broadband is putting stress on existing arrangements. In the past, the pace of network deployment was far slower. One can debate whether this is part of the Problem, but it is clear that it implies an urgent need to find good solutions.

As usual, the definition of the Problem flows directly from the Weaknesses identified in the SWOT analysis (see Section 3.6.1). Weaknesses identified include:

- Procedures are extremely diverse, and coordination at EU level extremely challenging (Section 3.6.2.1).
- The time from application to the start of network deployment is substantial and not fully predictable (Section 3.6.2.2).
- EMF rules in some Member States or municipalities are far more stringent than (non-binding) EU norms (Section 3.6.2.3). This poses challenges for construction of wireless infrastructure.

3.6.2.1 Procedures are extremely diverse, and coordination at EU level extremely challenging

Fragmentation is an issue for every aspect of the RFEC, but decentralisation of permitting down to Member State or municipal local level is pervasive, making it particularly difficult to solve or even to obtain a comprehensive view of the Problem.

Responding to applications to deploy infrastructure inherently requires detailed understanding of local circumstances; it thus not surprising that it tends to be delegated to low levels within most Member States.

Delegation to a low level is not necessarily a Problem in and of itself; however, it becomes a Problem element to the extent that it leads to (1) inefficiency, (2) lack of predictability, (3) lack of transparency, or (4) inability to gather statistics in order to obtain a comprehensive view of the problem at European level. There appears to be ground for concern in some Member States (see Section 3.6.2.2).

3.6.2.2 In some Member States, the time from application to the start of network deployment is substantial and not fully predictable

The time to obtain the right to access to land in order to deploy facilities is within the scope of the RFEC. Problems or delays in obtaining other permits that are in practice required are not within the scope of the RFEC, but often delay construction in practice, thus impacting the ability of the RFEC to achieve its goals.

In evaluating current arrangements, we identified substantial variability in (1) the time period between application and the granting of rights of way; (2) the duration for which rights of way are granted; and (3) the fees associated with the granting of rights of way (see Table 22, Table 23 and Table 24 in Section 2.4.3).

Historical problems have also been documented in Commission Implementation Reports over the years.⁴²⁸

Problems with granting rights of way have substantially different impact on (1) long-haul backbone infrastructure, (2) fixed broadband, and (3) mobile / wireless infrastructure.

- The total mileage required for long-haul infrastructure is far less than for “last mile” fixed infrastructure, and it is sometimes possible to follow the route of existing roads, railroads, or other infrastructure.
- The time to obtain necessary permits for fixed broadband seems to be far less than for mobile or wireless networks. The Commission’s public consultation in support of Directive found that the time for permit granting for fixed networks could run “between 2 weeks and 9 months”, while the time for mobile networks could run for years.⁴²⁹

⁴²⁸ See, for instance, European Commission (2016), Implementation of the EU regulatory framework for electronic communications – 2015, SWD(2015) 126, p. 19. See also European Commission (2013), “Impact Assessment Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks”, COM(2013) 147, Commission Staff Working Document, SWD(2013) 73, 26.3.2013, p. 24, which notes that a few “...best practices however do exist. For example certain municipalities from the Netherlands or from Finland (Tampere) take an active coordination role regarding all necessary permits besides rights of way. In some countries, such as the Netherlands, rights of way are free of charge. A recent Greek law has also established a “one-stop-shop” for obtaining all the necessary permits to roll out a radio-network. Exemptions exist for certain categories of antennae and base stations e.g. in Greece and in the Netherlands. In Italy requests for certain permits are deemed as approved when no explicit decision is taken within a given deadline (‘tacit approval’).”

⁴²⁹ European Commission (2013), Impact Assessment Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks, COM(2013) 147, Commission Staff Working Document, SWD(2013) 73, 26.3.2013, Annex I, page 9: “The responses confirmed the existence of a patchwork of lengthy, uncoordinated and unclear permit granting procedures, varying between countries and levels of administration and hindering the efforts of operators to roll-out high speed electronic communications access networks. Permit granting for radio-networks appears to be significantly more timeconsuming than for fixed networks. While for the latter, the time varies between 2 weeks and 9 months, delays for receiving the necessary permits to roll-out radio-networks can go up to years and the industry notes a trend towards increasing timetables. Delays are attributed to the different administrative requirements, even within Member States, regions and municipalities, which require a huge amount of paperwork but also to the fact that radio-networks rely more on the use of private land, a factor which further delays deployment. Access of private buildings and property from fixed network providers appears also quite problematic and significantly delays NGA network deployment.”

- Evidence gathered by the GSM Association shows that the procedures for mobile networks can be very time-consuming. For base stations, typical timescales for planning permissions in Europe are more than 20 months in several Member States, with a tendency for these delays to increase rather than decrease over time.⁴³⁰

The cost of obtaining permits can be substantial, but there are no reliable estimates. In summarising responses to the public consultation in support of the Cost Reduction Directive, the Commission noted: *“It appears that permit granting for radio-networks is substantially more expensive than for fixed networks: While for fixed networks, the costs are in the order of few hundreds of euro, for mobile networks they can reach thousands. In some Member States, no fees for rights of way are collected, whereas in other, fees are quite expensive. It would be impossible to extrapolate from the responses to the public consultation an average of the cost of permit granting in the EU. Some respondents indicate that this could lie between 10% and 1/3 of the total cost of the infrastructure.”*⁴³¹

Our own data show wide variation among the Member States (see Section 2.4.3).

Some of these concerns can be expected to be ameliorated once there is full transposition and implementation of the Cost Reduction Directive, Directive 2014/61/EU.⁴³²

3.6.2.3 EMF rules in some Member States or municipalities are far more stringent than EU guidelines

The health effects associated with Electromagnetic Fields (EMF) are a long-standing and well known health concern. For equipment to be deployed, a non-binding Council Recommendation on the permissible level of emissions has been in place at European

⁴³⁰ GSMA (2013), Base station planning permission in Europe 2013, Figure 1, page 7, at <http://www.gsma.com/gsmaseurope/gsma-europe-report-on-base-station-planning-permission-ineurope/>, viewed 31 August 2016. This summary of results appeared in the impact assessment accompanying the proposed cost reduction Directive (COM(2013) 147 final), p. 23.

⁴³¹ European Commission (2013), Impact Assessment Accompanying the document Proposal for a Regulation of the European Parliament and of the Council on measures to reduce the cost of deploying high-speed electronic communications networks, COM(2013) 147, Commission Staff Working Document, SWD(2013) 73, 26.3.2013., Annex I, page 9.

⁴³² Directive 2014/61/EU .

level since 1999.⁴³³ The Council Recommendation sets forth a general framework, but in very general terms and in the context of minimal harmonisation.⁴³⁴

A number of Member States including Italy and Belgium implement EMF maximum authorised exposure limits that are far more restrictive than those advocated at European level.⁴³⁵ In light of the principle of subsidiarity and the absence of strict harmonisation, Member States are free to do so. Municipalities sometimes also play a role, for instance by imposing stricter EMF rules on locations that the municipality itself rents to network operators. The scientific basis for these tighter restrictions is often unclear.

Although EMF rules clearly impact the deployment of wireless networks, the RFEC does not provide for the harmonisation of national EMF rules.⁴³⁶ A study in France found that lowering EMF limits would significantly delay the deployment of LTE.⁴³⁷ A 2013 study by the GSMA identified restrictive EMF limits in Belgium, Bulgaria, and Italy, as well as potentially time-consuming procedures in multiple Member States.⁴³⁸

This is a sensitive topic inasmuch as it deals not only with electronic communications, but also with public health. Sensitive or not, it is relevant to this study to the extent that it impacts wireless deployment.

3.6.3 Candidate Action Lines relevant to access to land

Our evidence base, including consultation responses, interviews, and data collected, indicate enormous diversity in the ways in which rules regarding access to land are implemented at Member State and municipal level. This diversity in granting rights of way (together with the problems involved in granting building permits) can lead to long

⁴³³ See the Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz). Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC is also relevant. See also International Commission on Non-Ionizing Radiation Protection (1998), “ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz)”.

⁴³⁴ Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz), recital 15: “Member States may, in accordance with the Treaty, provide for a higher level of protection than that set out in this recommendation.”

⁴³⁵ See for instance <http://www.elektrosmoginfo.de/> under “Grenzwerte”. Some values are more stringent than those in Annex II of the Council Recommendation of 12 July 1999 (*ibid.*).

⁴³⁶ Marcus J. S. and J. Burns (2013), “Impact of traffic off-loading and related technological trends on the demand for wireless broadband spectrum, study for the European Commission, page 128.

⁴³⁷ In July 2013, for example, a report commissioned by the French Ministries of Ecology and of the Digital Economy showed that lowering exposure to EMF from mobile base stations (2G and 3G) to a maximum level of 0.6V/m would significantly reduce mobile network coverage, especially inside buildings.

See http://www.developpement-durable.gouv.fr/IMG/pdf/rapport_COPIC_31_juillet_2013.pdf.

⁴³⁸ GSMA (2013), “Base station planning permission in Europe 2013”, Figure 1, page 7, at <http://www.gsma.com/gsmadeurope/gsma-europe-report-on-base-station-planning-permission-europe/>, viewed 31 August 2016.

and problematic delays in deploying network infrastructure, and to lack of predictability for market players.

In this thematic area as in the others, Action Lines seek to address or mitigate aspects of the Problem. The key Problem elements identified in regard to access to land and rights of way are (see Section 3.5.3):

- Because the granting of permits for access to land and rights of way is highly decentralised, procedures are extremely diverse, and coordination at EU level extremely challenging (Section 3.6.3.1).
- The time to obtain access to land and building permits needed for network deployment is substantial and not fully predictable. Permitting can be expensive, thus impeding network deployment (Section 3.6.3.2).
- EMF rules in some Member States or municipalities are far more stringent than (non-binding) EU norms. This poses challenges for construction of wireless infrastructure (Section 3.6.3.3).

3.6.3.1 Procedures are extremely diverse, and coordination at EU level extremely challenging

New Action Lines will tend not to be needed where problems have already been addressed. The Cost Reduction Directive (CRD) that was enacted in 2014⁴³⁹ already provides numerous provisions that seek to ameliorate the wide divergence among the Member States, and to reduce unjustified delays (beyond four months) in granting of various rights. The CRD is not part of the RFEC, but it can be viewed as a complementary measure that is likely to have a positive impact on the effectiveness of these aspects of the RFEC. That transposition and implementation of the Cost Reduction Directive are delayed in most Member States (see Section 2.4.5.4) is problematic, but it is nonetheless necessary to ask whether further measures are required. In particular, the provisions of Article 7 of the Directive that call for the “all relevant information concerning the conditions and procedures applicable for granting permits for civil works needed with a view to deploying elements of high-speed electronic communications networks” are “available via the single information point” should be helpful. The requirement that Member States “ensure that the competent authorities grant or refuse permits within four months from the date of the receipt of a complete permit request” speaks directly to one of the key problems to date.

The Directive does not seek to further harmonise the duration for which rights are granted, nor the fees that are charged, and neither of these are addressed in Articles 11 or 12 of the Framework Directive.

⁴³⁹ Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks.

There could thus be an argument for standardising these aspects. In the case of the duration of rights granted, we have found no indications that divergence is problematic. In the case of fees charged, however, the Commission's public consultation in support of the Cost Reduction Directive found large and highly variable fees (see Section 3.6.2.2). A recommendation or decision to harmonise the fees charged, could be considered.

Candidate Action Line 14: The Commission could consider a recommendation or decision to harmonise the the fees charged for access to land or granting of permits.

3.6.3.2 In some Member States, the time from application to the start of network deployment is substantial and not fully predictable

We have addressed the variability of fees with Candidate Action Line 14, and overly stringent EMF standards with Candidate Action Line 15. Given that the Cost Reduction Directive also seeks to limit the maximum time for the granting of permits, further measures at this time beyond those already put forward do not appear to be warranted.

3.6.3.3 EMF rules in some Member States or municipalities are far more stringent than EU norms

As regards EMF levels, any action taken should be consistent not only with Recommendation 1999/519/EC of the Council of 12 July 1999,⁴⁴⁰ but also with Directive 2013/35/EU.⁴⁴¹ These non-binding recommendations identify minimum standards, but nowhere do they specify a maximum to the stringency that Member States or municipalities may impose; at the same time, Article 11 of Directive 2013/35/EU empowers the Commission to enact purely technical delegated acts. Taking all of this into account, there is an Action Line that could be considered, but it should be viewed as being somewhat radical.

Candidate Action Line 15: Consider introducing legislation that would establish upper bounds for the stringency of EMF standards that Member States or municipalities could introduce in the absence of a reasoned request for derogation.

⁴⁴⁰ Recommendation 1999/519/EC of the Council of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) [1999] OJ L 30.7.1999, p. 59.

⁴⁴¹ Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and repealing Directive 2004/40/EC [(OJ L 179, 29.6.2013, p. 1.

3.6.4 Adapting candidate Action Lines to address different possible scenarios of market and technology evolution

The candidate Action Lines for access to land and the granting of permits are not much influenced by the market and technology changes we have explored. Shifts between fixed versus mobile networks, and between the number of macro-cells versus small cells in mobile networks, would tend to influence the number of permits required, but would not conspicuously change the policy measures required.

3.7 End-user rights

We begin with a SWOT analysis, then follow with an analysis of the Problem, a series of candidate Action Lines, and reflections on the implications of possible scenarios of market and technology evolution.

3.7.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework

Table 54: Strengths, weaknesses, opportunities and threats (SWOT): End-user rights⁴⁴²

	Positive	Negative
Current or predictable	<p>Strengths</p> <ol style="list-style-type: none"> Thanks to minimal harmonisation, national authorities enjoy discretion to respond to threats observed in their respective Member States. End-users are well protected by USD provisions that address most of the relevant issues (complete contract terms, information on contract terms, transparency and quality of service, termination and switching). Both business and residential end-users are covered by the protection of the USD. Member State authorities that enforce USD end-user rights have good knowledge of national circumstances, including the resolution of end-user complaints. 	<p>Weaknesses</p> <ol style="list-style-type: none"> Minimal harmonisation leads to harmful fragmentation. Network operators and businesses operating in multiple Member States are confronted with different USD end-user protection rules, thus increasing compliance costs and negatively impacting residential cross-border business. Overlaps between USD provisions and horizontal consumer protection law risk increased compliance costs. In some Member States, multiple bodies handle end-user consumer complaints. Overlapping roles may confuse end-users and thus impede effectiveness. The increased significance of non-ECS OTT services that fall outside of sector specific end-user rules may distort competition due to lower compliance requirements. It may lead to gaps in the protection of end-users of OTT services, thus undermining the effectiveness of USD end-user protections. Bundled services pose challenges, for example when a component of a bundle is cancelled. End-user contract duration limits may dissuade investment in challenge areas.
Not fully predictable	<p>Opportunities</p> <ol style="list-style-type: none"> The provisions of the Universal Service Directive that overlap most heavily with the Consumer Rights Directive could be eliminated. The Internet could facilitate price and quality of service comparisons and the sharing of consumer information, thus better achieving the transparency and QoS goals of Art. 21 and 22 USD. 	<p>Threats</p> <ol style="list-style-type: none"> If USD sector-specific rules were withdrawn altogether, business and especially small business end-users might be less well protected due to the inability of horizontal consumer protection legislation to address certain specific issues that arise in the electronic communications sector. If telecom dispute resolution is increasingly handled under horizontal legal instruments, they might increasingly be handled by non-telecom experts. This might reduce effectiveness.

Source: WIK-Consult.

⁴⁴² Where a Strength and a Weakness are opposite sides of the same coin, we have assigned the same sequence number to both; otherwise, we do not provide a sequence number.

3.7.2 Problem definition and problem drivers

We have found a relatively high level of consumer satisfaction with regard to contract information and ease of comparability in surveys, and also a relevant amount of switching in the past. This suggests that the provisions of the Universal Service Directive in relation to specified contract terms (Art. 20.1 USD), contract withdrawal, duration and termination (Art. 20.2, Art. 30.5-6 USD), transparency and publication of information (Art. 21 USD), quality of service (Art. 22 USD) and number portability (Art. 30.1-4 USD) have worked well.

In the SWOT, we identified a number of specific concerns, which form the basis for the Problem definition insofar as it relates to end-user rights:

- Minimal harmonisation leads to harmful fragmentation, thus confronting network operators and businesses operating in multiple Member States with different USD end-user protection rules and increased compliance costs (Section 3.7.2.1).
- Overlaps between USD provisions and horizontal consumer protection law risk increased compliance costs (Section 3.7.2.2).
- In some Member States, multiple bodies handle end-user consumer complaints, with the risk that overlapping roles confuse end-users and thus impede effectiveness (Section 3.7.2.3).
- The increased significance of non-ECS OTT services that fall outside of sector specific end-user rules may distort competition due to lower compliance requirements. It may lead to gaps in the protection of end-users of OTT services, thus undermining the effectiveness of USD end-user protections (Section 3.7.2.4).
- Bundled services are posing new challenges, for example when a component of a bundle is cancelled (Section 3.7.2.5).
- End-user contract duration limits may dissuade investment in challenge areas (Section 3.7.2.6).

3.7.2.1 Minimal harmonisation leads to fragmentation

Minimal harmonisation of the RFEC can lead to fragmentation among the Member States. Here as in other aspects of the RFEC, whether divergence among the Member States is harmful depends on the nature of the divergence and the context. In the case of RFEC provisions to protect end-user rights, we infer that network operators and businesses operating in multiple Member States are confronted with different end-user protection rules, which tend to increase compliance costs for network operators. It may also negatively impact residential cross border business.

Differences among the Member States include:

- In ten of the Member States, the obligation to provide contracts with specified clauses applies expressly only to contracts with consumers, not to contracts with other (e.g. business) end-users (see Section 2.5.3.1).
- In nine of the Member States, if a contract change benefits the end-user, the minimum notice period may either be shorter than the one month provided for in the Universal Service Directive, or there may be no obligation for notice (see Section 2.5.3.2).
- All Member States have arranged in one way or another for service providers to make available transparent, comparable, adequate and up-to-date information in respect the services provided to end-users and consumers; however, the detailed arrangements and the information to be provided varies (see Section 2.5.3.3).
- Either service or tariff comparison facilities are available in all but one of the Member States, provided either by the NRA or by third parties; however, the scope of the services covered and service parameters compared widely varies (see Section 2.5.3.4).
- Rules for maintaining QoS are highly diverse. Eight of the Member States have specific minimum QoS obligations in place for services such as broadband delay, or call centre services; conversely, seven Member States have no QoS measures at all in place (see Section 2.5.3.5).
- With the exception of Spain, all Member States have implemented the 24 month maximum contract provisions and the optional 12 month contract duration; however, provisions as regards automatic renewals, contract duration after renewal, and payment after early termination vary substantially among the Member States. Arrangements regarding subsidised handsets and SIM locking vary greatly as well (see Section 2.5.3.6).
- As regards number porting, provisions are once again varied. In eighteen of the Member States, charges for number porting are rare or non-existent in practice, but in the other eight Member States, charges from €5 to €10 are charged in practice (see Section 2.5.3.7).

That arrangements are highly diverse does not necessarily imply that they fail to protect end-users. For example, the 2016 Eurobarometer survey⁴⁴³ found that 84% of

⁴⁴³ European Commission (2016), E-Communications and the Digital Single Market, Special Eurobarometer 438, May 2016 (<http://ec.europa.eu/COMMFrontOffice/PublicOpinion/index.cfm/ResultDoc/download/DocumentKy/72564>).

European households felt that the contract had sufficient and clear information on duration and renewal or roll-over conditions.⁴⁴⁴ In no Member State did less than 75% of households have a positive perception. 83% of European households also felt that the contract had sufficient and clear information on the quality of services subscribed to (see Section 2.5.4.1).

One can thus debate whether these differences are harmful for consumers, but it seems fairly clear that business end-users that operate in multiple Member States have to cope with considerable complexity as a result, and that telecom operators active in multiple Member States are faced with increased compliance costs.

3.7.2.2 Overlaps between USD sector-specific measures and horizontal measures

Overlaps between USD sector-specific measures to protect end-users versus horizontal consumer protection measures risk confusion for end-users, increased compliance costs for businesses and network operators, and the prospect of multiple penalties. This element of the Problem definition appears in most of the thematic aspects that we consider in this study (see for instance Section 3.3.2.2).

The USD provisions on specified contract terms (Art. 20.1 USD), contract withdrawal, duration and termination (Art. 20.2, Art. 30.5-6 USD), and transparency and publication of information (Art. 21 USD) are overlapped by Consumer Rights Directive, Unfair Commercial Practices Directive and Unfair Contract Terms Directive; however, the overlap between USD and the horizontal Directives is only partial. First, while the objectives of the USD and the horizontal Directives are similar, there are multiple differences in the way protection measures are specified. Second, the horizontal Directives are limited to contracts with consumers, and do not cover business end-users.

The provisions of the USD on quality of service (Art. 22 USD) and number portability (Art. 30(1) through 30(4) USD) are specific to electronic communications networks and services; consequently, there is no specific overlap with horizontal Directives. Regulators with specific knowledge are arguably best equipped to deal with these issues.

The USD provisions on out-of-court dispute resolution (Art. 34 USD) are extensively overlapped by the Alternative Dispute Resolution (ADR) Directive. The latter also takes priority over the USD in case of conflicts. The ADR in its present form does not fully replace Art. 34 USD as it is limited to consumers and does not cover disputes involving business users.

⁴⁴⁴ This was the fraction out of those European households where someone had read the communications contract before signing it, and as of October, 2015.

3.7.2.3 Overlaps among multiple authorities that handle end-user consumer complaints under the USD in some Member States

In some Member States, multiple bodies handle end-user consumer complaints under the USD. The overlap of competencies among these different bodies risks lack of clarity for end-users, thus impeding the effectiveness of these USD provisions. This is particularly visible in regard to the out-of-court dispute resolution mechanisms required under Article 34 of the Universal Service Directive.

Out-of-court dispute resolution is handled in seventeen Member States by a single entity, either the NRA or the industry. In the remaining Member States, dispute resolution is handled by two or even three entities (often some combination of the NRA, an industry body, the ministry, or a consumer organisation). There is often an explicit allocation of responsibilities (for instance, mediation by the NRA and dispute resolution by a consumer organisation). This carries the risk, however, that telecom disputes might be handled by non-telecom experts, which might not be in the interest of end-users.

3.7.2.4 Increased relevance of non-ECS Over-the-Top (OTT) services

The increased significance of non-ECS OTT services that are not subject to sector-specific end-user rules has already led to different levels of end-user protection for end-users of OTT services in comparison with those provided for end-users of other electronic communications services, thus undermining somewhat the effectiveness of USD end-user protections. It might also distort competition between ECS network operators and non-ECS OTT service providers who compete with them. The discussion of OTT services that appears in Sections 1.5 and 3.3.2.2 is relevant.

These concerns are closely linked to concerns over the overlap between sector-specific versus horizontal regulation. Horizontal regulation applies equally to ECS market players, to non-ECS OTT market players, and to all other market players. Horizontal instruments thus raise few if any concerns in regard to competitive distortions.

3.7.2.5 Bundled services pose challenges, for example when a component of a bundle is cancelled

Bundled services are raising challenges in terms of protecting end-user rights. As a specific case in point, our evidence base demonstrates that rules on termination (and especially on early termination) have not been consistently imposed (see Section 2.4.5.6).

3.7.2.6 Contract duration limitations may negatively impact investment in challenge areas

The USD provisions that limit contract duration to 24 months, and that oblige network operators to make a 12 month contract available, could be expected to contribute to customer churn. To the extent that higher customer churn introduces uncertainty into revenue flows for each network operator, these limits might be expected to negatively impact the level of investment, notably in so-called challenge areas.

Our analysis neither proves nor disproves linkages along these lines (see Section 2.4.5.6). For fixed networks, we found a statistically significant but weak linkage between the extent of switching with fixed number porting and fixed broadband penetration, but few other clear linkages. For mobile networks, we did not find a systematic relationship between the extent of switching with mobile number porting and relevant end-user provisions, nor with the maximum timeframe for mobile number porting, nor with external factors such as mobile competition (as indicated by the HHI) or GDP per inhabitant.

3.7.3 Candidate Action Lines relevant to USD end-user rights

Existing sector-specific rules provide good protection to end-users; however, current rules face challenges due to (1) the growth of OTT services, (2) overlaps between horizontal consumer protection regulation and sector-specific protection of end-users; and (3) increasing relevance of bundled services.

The Action Lines for end-user rights seek to respond to the relevant aspects of the Problem definition, as set forth in Section 3.7.2. Key elements of the Problem definition are:

- Minimal harmonisation leads to harmful fragmentation, thus confronting network operators and businesses operating in multiple Member States with different USD end-user protection rules and increased compliance costs (Section 3.7.3.1).
- Overlaps between USD provisions and horizontal consumer protection law risk increased compliance costs (Section 3.7.3.2).
- In some Member States, multiple bodies handle end-user consumer complaints, with the risk that overlapping roles confuse end-users and thus impede effectiveness (Section 3.7.3.3).
- The increased significance of non-ECS OTT services that fall outside of sector specific end-user rules may distort competition due to lower compliance requirements. It may lead to gaps in the protection of end-users of OTT services,

thus undermining the effectiveness of USD end-user protections (Section 3.7.3.4).

- Bundled services are posing new challenges, for example when a component of a bundle is cancelled (Section 3.7.3.5).
- End-user contract duration limits may dissuade investment in challenge areas (Section 3.7.3.6).

3.7.3.1 Minimal harmonisation leads to fragmentation

As regards fragmentation, the evidence base demonstrates widely divergent approaches among the Member States. This divergence is not necessarily problematic *per se*; however, it seems fairly clear that business end-users that operate in multiple Member States have to cope with considerable complexity as a result, and that network operators active in multiple Member States are thus faced with increased compliance costs. At the same time, trade-offs are complex: divergence at Member State level enables NRAs to respond flexibly to network operator abuses that may appear in particular Member States, and may enable innovative approaches that benefit end-users.⁴⁴⁵

There are several basic mechanisms available to achieve greater harmonisation:

- large portions of the Universal Service Directive might be replaced by a new Regulation establishing harmonised rules; or
- a new Directive might be introduced following a principle of maximum harmonisation, together with deletion of any no-longer-needed text from the Universal Service Directive; or
- the Commission might exercise its powers to “issue a recommendation or a decision on the harmonised application of the provision” in the Universal Service Directive, either under the authority of Article 19 of the Framework Directive (the source of the quoted text) or else under the more general authority of the TFEU. The first mechanism potentially achieves a much tighter harmonisation than the second.

Each of these mechanisms has strengths and weaknesses in terms of (1) the ease with which it can be adopted and implemented at Member State level, and (2) the degree to which it accommodates or restricts divergence at Member State level.

⁴⁴⁵ See also BEREC (2015), BEREC Opinion on the Review of the EU Electronic Communications Regulatory Framework, BoR (15) 206, p. 43-44.

A Regulation or Directive must go through the co-decision process with Parliament and Council, while a recommendation is subject only to comitology (and may therefore be quicker and less complicated to adopt); however, a Regulation has direct effect within the Member States, and does not depend on transposition.

In terms of the degree to which Member State divergence is constrained, the choice between a Directive versus a Regulation may be less critical than whether the text permits Member States to adopt or maintain additional requirements. A Recommendation can be very detailed, and may be well suited to the case where underlying circumstances vary greatly among the Member States, such that NRAs or courts need considerable discretion. A Regulation may by contrast be best suited for instances where rules can be unconditional, clear and precise; where this is not the case, it may be necessary to supplement the Regulation with further implementing regulations or guidelines.

Candidate Action Line 16: In order to achieve greater harmonisation of sector-specific end-user provisions, the Commission could (1) initiate a legislative proposal for a Regulation that would establish harmonised rules for end-user rights, replacing large portions of the Universal Service Directive; or (2) a new Directive might be introduced following a principle of maximum harmonisation, together with deletion of any no-longer-needed text from the Universal Service Directive; or (3) the Commission might exercise its powers under Article 19 of the Framework Directive to issue a recommendation or a decision with similar (but more limited) effect.

As an alternative, more narrowly targeted revisions to the USD could be considered in order to address the wide variation in contract termination practices that was identified in Section 3.7.2.1. This is partly a matter of fragmentation, but also addresses more general concerns.

The same revisions should deal with bundled services, including the (early) termination of components of a bundle. An important consideration is that bundled contracts should not automatically be extended when new components are added to the existing bundle.

Candidate Action Line 17: Consider revisions to Article 30(5) and 30(6) of the Universal Service Directive (or to a new corresponding Recommendation) so as to provide greater precision as to rules for contract renewal and for early termination of a contract, including in particular bundled services.

3.7.3.2 Overlaps between USD sector-specific measures and horizontal measures

The most far-reaching solution to overlaps between sector-specific rules versus horizontal consumer protection measures such as the CRD would be to eliminate the USD sector-specific measures to protect end-users altogether. Withdrawal of sector-

specific measures in favour of horizontal rules would be the most obvious solution, but might not be the best way to address the overlaps. Withdrawal would not be straightforward, and might reduce the level of protection for some end-users.

This radical solution would raise a number of questions. The first is that a number of the sector-specific provisions of the Universal Service Directive protect all end-users, not just residential end-users. Placing sole reliance on horizontal measures that protect only residential end-users would withdraw the USD's regulatory protection from business end-users, including small and medium businesses.

Further, the sector-specific provisions of the USD are often more detailed than the horizontal equivalents, which is to say that their elimination would also withdraw certain protections that all end-users currently enjoy. Horizontal consumer protection legislation cannot address certain specific issues that arise in the electronic communications sector.

Finally, the degree to which elimination of the USD sector-specific measures to protect end-users, in and of itself, would actually alter the position of end-users is debatable. Member States would not necessarily roll back existing end-user protection provisions at national level.

Candidate Action Line 18: Consider the somewhat radical approach of phasing out the USD's sector-specific protection of end-users altogether. Consider an extension of scope of the corresponding horizontal measures so as to cover end-users other than consumers.

A less far-reaching and less radical alternative to Candidate Action Line 18 would be to phase out those particular sector-specific rules that most heavily overlap horizontal measures, while leaving the rest. For example, the contract related provisions in the horizontal Consumer Rights Directive (CRD) overlap to a certain extent with Article 20(1) and 20(2) USD for end users, even if the lists of information to be provided, the scope of the provisions, and the moment when information duties are prescribed differ. Deletion of these USD Articles might nonetheless be considered. Article 34 is also a candidate, since it heavily overlaps with the Alternative Dispute Resolution (ADR) Directive, although there are differences in scope, as businesses are not covered by the latter. As a consequence, if Article 34 would be deleted, only consumers would be protected.

The deletion of sector-specific provisions in USD would not necessarily prevent fragmentation, as Article 5(4) of the CRD (prescribing general information duties) states that "Member States may adopt or maintain additional pre-contractual information requirements for contracts to which this Article applies."

In theory, the same legislative measure that deletes sector-specific provisions could potentially also amend the corresponding horizontal measure if gaps were identified (for

instance, to extend their coverage to include small and medium businesses when they subscribe to offers also used by residential consumers); however, this would need to be done with caution, if it were done at all, since doing so risks compromising the coherence and consistency of the horizontal measure.

Candidate Action Line 19: Selectively delete those sector-specific end-user protection provisions that overlap most with horizontal measures such as the CRD and ADR, including Articles 20(1), 20(2) and 34.

3.7.3.3 Overlaps among multiple authorities that handle end-user consumer complaints under the USD in some Member States

The overlap of function among two or more end-user protection organisations in several of the Member States seems problematic. A more coordinated approach at EU level could be achieved by ensuring that the tasks of the bodies designated as national regulatory authorities are harmonised.

3.7.3.4 Increased relevance of non-ECS Over-the-Top (OTT) services

As with most of the RFEC thematic areas that we are assessing, the increasing relevance of OTT services poses challenges. The possibility of redefinition of ECS, or of clarification of its definition, was addressed in Sections 1.5 and 3.3.3.

Some market players argue that for ECS to be subject to sector-specific provisions to protect end-user rights, while non-ECS OTT providers are not, is unfair and inconsistent with a “level playing field”. To the extent that some or all of these sector-specific provisions were phased out in favour of horizontal regulation (as discussed earlier in this section), this concern would be addressed. Non-ECS OTT players are already subject to horizontal regulations such as the CRD, at least in regard to consumers (but not for end-users that are not consumers, such as SMEs). The “level playing field” is thus of concern only to the extent that the USD imposes obligations that go beyond those of horizontal instruments such as the CRD.

One could instead consider making some of the end-user provisions of the Universal Service Directive applicable to non-ECS OTT service providers, subject to such providers falling under the future sector framework. Doing so might potentially address some of the “level playing field” concerns, but in doing so would expand the scope of the overlap between sector-specific versus horizontal regulation. Non-ECS OTT services are currently subject to horizontal obligations such as the CRD, but not to the corresponding USD end-user protection provisions. Expanding the scope of entities covered by the USD provisions would also expand the scope of entities subject to overlapping consumer protection provisions.

While the logic of this Action Line seems clear, the practical scope of application might prove to be quite limited. Many of the USD end-user provisions were designed with a network in mind. It is by no means clear that QoS obligations (Art. 22 USD), for example, are relevant to an OTT provider that does not own or control a network. The QoS delivered is heavily dependent on the access network that the end-user has selected, and is beyond the control of the OTT service provider. At a minimum, QoS would need to be interpreted very differently than is customary for providers of ECS today.

This appears to imply that any move in this direction would require a very fine-grained analysis, taking into account not only the text and meaning of a particular Article in the USD, but also (1) the reason why the provision exists in the first place, and (2) whether that rationale is meaningful for a particular OTT service, taking into account the business model of the OTT service in question. It would also be necessary to consider whether (3) imposition of the obligation in question would be proportional under the circumstances.

Our assessment is that Articles 20 and 21 USD could potentially be made to apply to non-ECS OTT services with little change, assuming that these Articles are not eliminated in favour of corresponding provisions in the CRD (see Candidate Action Line 19).

If OTT services that enable calls to be made to E.164 numbers were consistently treated as ECS (see Section 3.3.3.2 and especially Candidate Action Line 3), then a number of USD provisions would automatically and consistently apply to these OTT services in all Member States, including for instance Articles 26(2) and 27(1) USD.

Candidate Action Line 20: In order to achieve a more level playing field, revisions to individual sector-specific USD rules regarding end-user rights could be considered so as to make certain USD provisions applicable to certain non-ECS OTT service providers. Doing so would require a fine-grained analysis of the provision in question, and its appropriateness to the OTT service in question.

3.7.3.5 Bundled services pose challenges, for example when a component of a bundle is cancelled

The increased use bundles raises a number of concerns. Overall, the use of bundled services increases complexity for end-users. Rules with regard to contract duration and termination on the one hand and switching processes on the other hand may differ among the various services in the bundle (regulated ECS, unregulated ECS, and OTT services).

The immediate concern with renewal and (early) cancellation has been addressed with Candidate Action Line 17. The prospect that bundling might raise new end-user protection concerns in the future is discussed in Section 3.7.4.

3.7.3.6 Contract duration limitations may negatively impact investment in challenge areas

As regards the risk that limits on end-user contract duration may dissuade investment, if this is viewed as a problem serious enough to warrant a regulatory fix, one could consider lengthening the period. Current arrangements do appear, however, to generally serve a useful role in protecting end-users. Contract duration for electronic communication services is far longer than for most consumer services; moreover, the bundling of subsidised handsets introduces additional complexity, especially in the event of early termination of the contract, since the cost of the handset needs to be recovered.

Taking all of this into account, the argument in regard to investment is most compelling in challenge areas where investment to build out fast broadband would not otherwise be forthcoming based solely on market forces. In areas where network operators have sufficient motivation to invest, current arrangements appear to work well enough.

Candidate Action Line 21: The maximum contract duration might be extended for end-users of fast broadband lines in challenge areas in order to mitigate any negative impact on investment.

3.7.4 Adapting candidate Action Lines to address different possible scenarios of market and technology evolution

The primary area of concern in regard to these end-user protection provisions relates to the bundling of retail services, which has become common. Electronic communication services are often bundled with non-regulated retail services (e.g. TV and mobile) and/or OTT services. Additional services might also be added later to the initial bundle. Differences between bundle elements in regard to contract duration and conditions can increase the complexity of cancellation of part or all of the bundle, thus locking in the end-user. This is visible in the substantially reduced churn for triple and quadruple play bundles in comparison with single and double play bundles.

USD end-user protection provisions are already showing strain, for example, in terms of the handling of early cancellation of a bundled contract where portions of the bundle are subject to USD end-user protection provisions while other portions are not. We have treated this as a current problem, i.e. a Weakness, and have addressed it explicitly with Candidate Action Line 17.

As bundling becomes progressively more common, additional challenges raised by bundling are likely to become ever more prominent.

3.8 Must carry and EPG rules

Once again, we begin with a SWOT analysis, then follow with an analysis of the Problem, a series of candidate Action Lines, and reflections on the implications of possible scenarios of market and technology evolution.

3.8.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework

Table 55: Strengths, weaknesses, opportunities and threats (SWOT): ‘Must carry’ and EPG rules⁴⁴⁶

		Positive	Negative
Current or predictable		Strengths	Weaknesses
		<ol style="list-style-type: none"> 1. The rules deal reasonably well with linear radio and television broadcasting on traditional networks. 2. ‘Must carry’ rules provide Member State authorities with substantial ability to accommodate national specificities. <ul style="list-style-type: none"> • ‘Must carry’ mechanisms have ensured a strong presence of public service broadcasters and others on traditional distribution platforms, especially on cable TV networks. • Must carry mechanisms serve not only to address potential competitive harm to broadcasters with content of public interest, but also to reinforce media pluralism and freedom of expression. • Even if Member States (or regions within them) having good knowledge of the local environment have competence to impose must-carry rules if and as needed, Article 31 USD limits this power so as to ensure that these national rules remain proportionate to the public interest objective pursued. 	<ol style="list-style-type: none"> 1. ‘Must carry’ rules are geared toward “channels”, and do not address non-linear content. 2. ‘Must carry’ rules leave substantial room for interpretation. <ul style="list-style-type: none"> • There are claims that broadcasters sometimes abuse must carry rules, thus distorting the bargaining process between broadcasters and transmission service providers.
Not fully predictable		Opportunities	Threats
		<ul style="list-style-type: none"> • Continued technological progress enables more channels to be carried, further mitigating competitive concerns. This reduces the severity of the competitive aspects of the problem that ‘must carry’ seeks to address. Where ‘must carry’ rules in the past often accounted for most of the capacity of transmission medium (cable provider), capacity is less constrained today. • Continued progress in compression technology partly compensates for the bandwidth needed for higher resolution, further reducing competitive concerns. 	<ul style="list-style-type: none"> • The migration to high-definition and prospectively ultra-high-definition television channels (HDTV/UHDTV) might perhaps re-introduce scarcity (if it outruns improvements in compression technology), and with it might re-introduce competitive concerns that were otherwise in decline. • With the growth of non-linear content, search and recommendation facilities will become more important. This might raise new concerns regarding “findability”. Public broadcast channels and other specified content might become less visible in Member States where the broadcaster does not enjoy strong brand recognition.

Source: WIK-Consult.

⁴⁴⁶ Where a Strength and a Weakness are opposite sides of the same coin, we have assigned the same sequence number to both; otherwise, we do not provide a sequence number.

3.8.2 Problem definition and problem drivers

As usual, our definition of the Problem is based primarily on the Weaknesses in the SWOT analysis that appears in Section 3.8.1. The key concerns that we identify as elements of the Problem are:

- Article 31 USD is silent on non-linear audiovisual media services that are not associated with “channels” (Section 3.8.2.1).
- ‘Must carry’ rules leave substantial room for interpretation (Section 3.8.2.2).
- There are claims that broadcasters sometimes abuse ‘must carry’ rules, thus distorting the bargaining process between broadcasters and transmission service providers (Section 3.8.2.3).
- The question of whether ‘must carry’ rules are still required (Section 3.8.2.4).

Given the profound changes in the environment for audio and audiovisual media services, we also pose the threshold question as to whether ‘must carry’ rules continue to be required at all. This is a radical consideration, but it is necessary for the completeness of the analysis. We take this question up in Section 3.8.2.4.

3.8.2.1 ‘Must carry’ rules are geared toward “channels”, and do not address non-linear content

The rules in Article 31 USD are designed to address “channels”, not non-linear audiovisual media services.

Patterns of viewing are shifting in important ways. Usage of on-demand video (YouTube, short video clips, movies, TV series and programs) is steadily rising (see Sections 2.6.1.2.1 and 2.6.1.2.2). According to a survey of viewers in selected European and non-European countries, the percentage of people watching on-demand video rose to more than 50% in 2015.⁴⁴⁷ Linear, scheduled TV remains central for many households, because of its access to premium viewing and live content, ease of viewing and social aspects, but the percentage of people that watch linear TV at least once a day is steadily declining and has fallen below 60%. Even so, few households have cancelled their TV subscription to rely solely on OTT platforms on the public internet.⁴⁴⁸

⁴⁴⁷ Ericsson (2015), Consumerlab, TV and Media 2015, An Ericsson Consumer Insight Report, 2015. p. 6.

⁴⁴⁸ On the extent of ‘cord cutting’ which - strictly speaking - relates to the substitution of a pay-TV subscription by a VOD subscription, see C. Grece, Note 3 - The SVOD Market In The EU Developments 2014/2015, a publication by the European Audiovisual Observatory, November 2015.

In light of these changing characteristics, many stakeholders both in the Commission consultation on the review of the regulatory framework for electronic communications⁴⁴⁹ and in our own interviews took the view that 'must-carry' rules are no longer well suited to new and emerging market and technological realities. The changes requested could be said to fall in three broad groups:

- Some Member States and most broadcasters argued for extending the scope of 'must carry' rules to apply on a technologically neutral basis to all distributors of audiovisual content, including interactive and non-linear services and hybrid TV signaling, potentially including OTT platforms that provide linear channels and non-linear content over the public internet.
- Telecom operators suggested 'must offer' obligations for broadcasters and content owners in order to establish more of a level playing field between broadcasters and online platforms.
- Some cable and telecom operators argued that must-carry obligations are in most cases redundant and unnecessary.

We return to the merits of these arguments when we discuss candidate Action Lines in Section 3.8.3.

3.8.2.2 Must carry rules leave substantial room for interpretation

The European institutions have only limited ability in practice to harmonise approaches among the Member States. Article 6 TFEU states that the EU's competences in the field of culture are to "carry out actions to support, coordinate or supplement the actions of the Member States." Most rules regarding national broadcasters (including licensing) are decided by the Member States, taking into account the broader framework provided by the Union.

This is not necessarily a defect in general, since many considerations associated with 'must carry' are perhaps best dealt with at Member State level in any case in light of the differences in national languages and cultures among the Member States, and the extreme diversity of national media landscapes; however, our evidence base suggests that there are some aspects where divergence may be harmful. Three aspects that could be considered are:

- The significance criterion;
- Attempts to apply must carry status to channels of a PSB that do not necessarily contribute to pluralism and other general interest objectives in the manner intended for must carry; and

⁴⁴⁹ European Commission (2016), Synopsis Report on the public consultation on the evaluation and review of the regulatory framework for electronic communications, 20.4.2016.

- Remuneration for carrying channels.

First, the *significance* criterion is interpreted in varying ways, and there is no common approach to assure that ‘must carry’ obligations are imposed only “*if a significant number of end users of such networks use them as their principal means to receive radio and television broadcast channels*” (see Section 2.6.3.1).

Second, Article 31 of the Universal Service Directive establishes that must carry obligations may only be imposed “*where they are necessary to meet general interest objectives*.” The case law further establishes that the award of ‘must carry’ status must be based on objective criteria which are suitable for securing pluralism by ensuring access *inter alia* to national and local news on the territory in question. ‘Must carry’ status should thus not automatically be awarded to all television channels transmitted by a broadcaster, but must be strictly limited to those channels having an overall content which is appropriate to meet general interest objectives (see Section 2.6.2.1). Some cable operator interviewees report, however, that Public Service Broadcasters that operate multiple channels sometimes attempt to benefit by applying must carry rules to certain of their channels that arguably might not qualify in light of the case law. Judging whether specific channels should or should not qualify for ‘must carry’ treatment is far beyond the remit of our study, but we take note of their concern.

Finally, approaches to remuneration to the network operator are highly diverse at Member State level (see Section 2.6.4.1). Although public broadcasters and commercial broadcasters are increasingly competing for the same viewers and, in many Member States, for advertisement revenues, the Directives do not require that beneficiaries of ‘must carry’ pay transmission fees similar to those charged to other comparable TV channels on the same platform, thus leaving the door open to possible competitive distortions.

We note in passing that there is no linkage between the level of transmission fees paid to the network operator, and the copyright remuneration that the network operator is obliged to pay in order to carry the content.⁴⁵⁰ The RFEC does not deal with copyright remuneration.

3.8.2.3 Claims that broadcasters sometimes abuse ‘must carry’ rules

In the course of our interviews, some transmission platform operators claimed that broadcasters sometimes attempted to claim ‘must carry’ rights for commercial, low usage channels that did not fulfil any general interest objective. This suggests that there might possibly be issues with either the definition of “general interest objectives” at

⁴⁵⁰ Welker (2015), Hamburg Administrative Court refuses claim to free distribution of “‘must carry’” programmes, IRIS 2015-7:1/8. The article summarizes the judgment of the Verwaltungsgericht Hamburg of 29 April 2015 in case no. 17 K 1672/13 available on: <http://justiz.hamburg.de/contentblob/4505570/data/17-k-1672-13-urteil-vom-29-04-15.pdf>.

Member State level (see Section 2.6.2.1), or with enforcement of the restriction of ‘must carry’ to such services in some Member States. We note the concern, and think that these claims merit further attention; however, a detailed investigation of specific cases was not practical within the remit of the current study.

3.8.2.4 The question of whether ‘must carry’ rules are still required

‘Must carry’ rules exist to address two distinct needs: (1) potential competitive threats that transmission media that carry programming might discriminate against some broadcasters; and (2) protection of media pluralism and freedom of expression. Over the past decade, technological improvements have largely eliminated scarcity on most broadcast media, and have thus mitigated competitive concerns.

This is a profound change in the landscape, but it does not necessarily mean that the need for must carry has gone away. First, the elimination of scarcity on the transmission medium addresses competition issues, but does not in and of itself solve concerns in regard to media pluralism and freedom of expression. Second, higher capacity transmission media are not equally available in all regions of the EU. Third, it is not assured that scarcity is gone for good – transmission is moving to progressively higher resolution with UHD TV (and thus progressively greater demand for bandwidth), but compression technology is compensating at least in part for this higher bandwidth demand (see Section 2.6.1.1.2). In other words, the long term trend as regards scarcity is not yet altogether clear.

3.8.3 Candidate Action Lines relevant to ‘must carry’ and EPG rules

We present candidate Action Lines in the same sequence as the Problem elements that they seek to address.

3.8.3.1 ‘Must carry’ rules are geared toward “channels”, and do not address non-linear content

As noted in Section 3.8.2.1, the rules in Article 31 USD are designed to address “channels”, not non-linear audiovisual media services. In the Commission’s public consultation and in our interviews, many stakeholders took the position that ‘must-carry’ rules are no longer well suited to new and emerging market and technological realities.

Stakeholders often expressed these concerns in terms of OTT services, but the real issue in our view is with content that falls within the scope of the AVMS Directive, but not within the scope of the Universal Service Directive. These are not television broadcast channels, but rather on-demand services. This is the case not only for OTT services such as Netflix or YouTube, but also for SVOD by cable, satellite operators and (managed) IPTV service providers.

Some stakeholders argued for extending the scope of ‘must carry’ rules to apply on a technologically neutral basis to all distributors of audiovisual content, potentially including OTT platforms; others called for instituting ‘must offer’ obligations for broadcasters and content owners in order to establish a more of a level playing field between broadcasters and online platforms.

The advantages and disadvantages of broadening definitions to include OTT players in general has been discussed at many points in this report, including in Section 1.5.

There is no obvious public policy rationale for imposing must carry obligations on OTT platforms, since there are no obvious problems with scarcity or with the ability to impact pluralism or freedom of expression. The network neutrality provisions of Regulation 2015/2120 may serve to further reduce any risks to competition and to pluralism.

There could be a valid public policy rationale for ‘must offer’ obligations under certain circumstances, but we consider the question to be out of scope to the extent that it relates to copyright policy rather than electronic communications policy.

3.8.3.2 Must carry rules leave substantial room for interpretation

We identified three specific areas where divergence might be problematic:

- The significance criterion;
- Attempts to apply must carry status to channels of a PSB that do not necessarily contribute to pluralism and other general interest objectives in the manner intended for must carry; and
- Remuneration for carrying channels.

As far as the significance criterion is concerned, some Member States set a very low threshold for the definition of “on undertakings under their jurisdiction providing electronic communications networks used for the distribution of radio or television broadcast channels to the public where a significant number of end-users of such networks use them as their principal means to receive radio and television broadcast channels” (see Section 2.6.6.2). Under these conditions, the must carry obligation may represent a disproportionate burden on platforms that are subject to competition from other platforms.

This is clearly an element of the Problem, but we have not identified a workable mitigation. It appears to be impractical, for instance, to identify a single quantitative bound (e.g. percentage of population) that could apply to multiple Member States.

Certain national best practice practices could be promoted, such as the German approach to exempt network operators from must-carry obligations if they can prove to the supervisory authority of the federal state that another provider in the same region on

the same type of network, with the same type of reception equipment and without any extra costs for the receivers, already provides ‘must carry’ channels, or if the provider can prove that another provider has met the requirements of diversity set by the ‘must carry’ regulations.⁴⁵¹

There are risks associated with such an approach, since it effectively locks in any existing asymmetries in the treatment of transmission platforms.

Candidate Action Line 22: Consider implementing transparent and objective mechanisms at European level to exempt from ‘must carry’ obligations any transmission platforms that can demonstrate that the objectives are already met in some other way.

Differences are visible among the Member States as regards remuneration (carriage fees), if any, from ‘must carry’ broadcasters to transmission platforms. Article 31 of the Universal Service Directive specifies that remuneration to the transmission platform should be “applied in a proportionate and transparent manner”, but does not require that it be provided at all. There is no requirement that remuneration be comparable to that paid by similarly situated non-must-carry broadcasters (possibly important for competitive neutrality).

Article 31(2) USD covers remuneration only in the context of carriage of content. Copyright and content aspects are outside the scope of the RFEC. One might well ask whether the level of remuneration in the sense meant by Article 31(2) is appropriate in a particular instance in light of charges for content, but this seems impractical in that the different payments are dealt with by separate bodies of law and regulation. We treat the question as being out of scope for this study.

Candidate Action Line 23: Consider implementing consistent, transparent and objective guidelines at European level for the level of remuneration for carriage from broadcasters to transmission platforms, together with obliging Member States to empower NRAs to adjudicate disputes concerning remuneration for ‘must carry’ channels.

3.8.3.3 Claims that broadcasters sometimes abuse ‘must carry’ rules

As noted in Section 3.8.2.3, we think that these claims merit further attention; however, a detailed investigation of specific cases was not practical within the remit of the current study. We propose no candidate Action Lines.

⁴⁵¹ See Van Eijck, N. and van der Sloot, B. (2012), Must-carry Regulation: a Must or a Burden?, *IRIS plus*, 2012/5., p. 16

3.8.3.4 The question of whether ‘must carry’ rules are still required

Our evidence base demonstrates that there are substantial interrelated shifts in technology, in the marketplace, and in viewing characteristics, all of which have implications for ‘must carry’ rules. Is ‘must carry’ still needed at all in light of these changes?

This is partly a question of competitive forces, which are related to transmission capacity in relation to demand, but is also in large part a matter of protecting media pluralism and freedom of expression. The profound changes in the landscape do not necessarily imply that the need for ‘must carry’ has gone away. First, the elimination of scarcity on the transmission medium mitigates competition issues, but does not in and of itself solve concerns in regard to media pluralism and freedom of expression. Second, higher capacity transmission media are not equally available in all regions of the EU. Third, it is not assured that scarcity is gone for good – the long term trend as regards scarcity is not yet altogether clear.

A radical Action Line could be considered where ‘must carry’ provisions are phased out or eliminated altogether. We note that merely eliminating references to ‘must carry’ in the RFEC would not in and of itself eliminate ‘must carry’, since existing legislation at Member State level would remain. It might be necessary instead or in addition to specify suitably demanding thresholds of proportionality, such that ‘must carry’ would not come into play unless there were a strong, demonstrated need. Given that elimination of ‘must carry’ altogether appears to be a rather extreme and low probability approach, we do not specify exactly how this might be accomplished.

Candidate Action Line 24: Consider the radical Option of phasing out ‘must carry’ altogether.

The increase in the transmission capacity of broadcast networks as a result of their digitisation, together with the implementation of new transmission standards and compression technologies, allow for a substantial number of channels on cable, satellite and IPTV networks, although DTT is more capacity constrained (see Section 2.6.1.1.2). This can be assumed to have benefitted some ‘must carry’ channels more than others. The competition between traditional broadcast platforms (terrestrial, cable, satellite and IPTV) as well as new OTT platforms, and the commercial incentive of network and platform operators to carry channels to exploit existing capacity provides incentives to carry many of the channels that qualify for must carry. These incentives are probably sufficient to ensure that “important” channels,⁴⁵² however defined, are carried, but may

⁴⁵² The major channels of Public Service Broadcasters would probably be carried with or without ‘must carry’ obligations in most Member States.

not be sufficient to ensure that *all* channels that satisfy the relevant general interest objectives would tend to be transmitted even in the absence of ‘must carry’ obligations.

With that in mind, one could consider changes to Article 31 USD such that ‘must carry’ would apply only to those channels that satisfy the relevant general interest objectives, but that are unlikely to be sufficiently ‘important’ to be carried in the absence of a ‘must carry’ obligation.

We do not provide a candidate Action Line to do this. This may be useful as a thought exercise, but we see little prospect in practice of rigorously defining a class of channels that are of sufficient general interest to warrant protection under ‘must carry’, but not sufficiently desired by the public to ensure that they would be carried in the absence of ‘must carry’.

3.8.4 Adapting candidate Action Lines to address different possible scenarios of market and technology evolution

There are multiple potential challenges to the ‘must carry’ and EPG regime as technology, markets, and viewer preferences continue to evolve. Monitoring the evolution of these trends is in order, so as to be able to initiate a timely policy response should it be needed.

3.8.4.1 Growing importance of “findability” of content

There appear to be few problems as regards EPG rules today, but many stakeholders expressed concern that the marketplace is evolving such that problems might well emerge with Internet-based applications that make ‘must carry’ content easy to find. With the growth of both linear and non-linear content, search and recommendation facilities (findability) become ever more important. Public broadcast channels and other specified content might become less visible in Member States where the broadcaster does not enjoy a strong brand reputation. Radio broadcasters were particularly vocal in expressing concerns.

There is no systematic EU regime for findability, and Member States are not bound by the non-discrimination principle when imposing obligations related to presentational aspects of EPGs. Integrated firms that provide both a broadcast transmission medium and content over the medium might be especially strongly motivated to give greater visibility to affiliated content than to non-affiliated content.

Were such problems to emerge, the obvious policy response would be to impose on any firms that provide (or are affiliated with) both transmission and content a non-discrimination obligation regarding applications used to find content.

3.8.4.2 There is no assurance that the gains in the number of channels will continue

As noted in Section 2.6.1.1.2, the migration to high-definition and prospectively ultra-high-definition television channels (HDTV/UHDTV) might perhaps re-introduce scarcity if it outruns improvements in compression technology, together with gains in the speed of transmission media. If this happens, the competitive threats that 'must carry' seeks to address might re-emerge.

The interplay among these opposing forces cannot be predicted with certainty today. Monitoring of ongoing developments is therefore in order.

Questions of scarcity of capacity may influence individual decisions in individual Member States, but they are unlikely to require overall revision of the 'must carry' rules that appear in Art. 31 of the Universal Service Directive. The rules already enable Member State authorities to deal with national specificities.

3.9 Overall assessment

In this section, we bring together common themes from the SWOT analyses for the various thematic areas. We do not introduce candidate Action Lines here, since each of these aspects of the Problem was addressed in connection with the thematic area or areas with which it is associated.

3.9.1 Strengths and weaknesses of the implementation of relevant aspects of the European Regulatory Framework: Common characteristics

Table 56: Strengths, weaknesses, opportunities and threats (SWOT): Overall⁴⁵³

		Positive	Negative
Current or predictable		Strengths	Weaknesses
		<ol style="list-style-type: none"> 1. Minimal harmonisation of most aspects of the RFEC enables national authorities to accommodate Member State specificities well where appropriate. <ul style="list-style-type: none"> • Member State authorities generally have good subject matter knowledge and understand Member State specificities. • Existing RFEC provisions deal with a wide range of concerns. 	<ol style="list-style-type: none"> 1. In each thematic area, divergence among the Member States is substantial. Aspects of this divergence are harmful, impacting network operators, service providers, and/or end-users that operate in multiple Member States. <ul style="list-style-type: none"> • The need to promote connectivity at high speeds is widely recognised today, but was less visible when the RFEC was last amended in 2009, and is not explicitly recognised as a regulatory objective; consequently, the tools to promote high speed connectivity in the RFEC are patchy and incomplete • Current arrangements have not fully adapted to growing use of bundled services. • Current arrangements have not consistently addressed the emergence of non-ECS OTT services that compete with ECS.
Not fully predictable		Opportunities	Threats
		<ol style="list-style-type: none"> 1. Technological progress brings benefits to Europeans, and mitigates some of the concerns that drove regulation. 	<ol style="list-style-type: none"> 1. Technological progress often introduces new challenges. <ul style="list-style-type: none"> • Technological progress might slow going forward, re-introducing concerns that drove regulation.

Source: WIK-Consult.

⁴⁵³ Where a Strength and a Weakness are opposite sides of the same coin, we have assigned the same sequence number to both; otherwise, we do not provide a sequence number.

3.9.2 Problem definition and problem drivers

From the discussion of the six thematic areas, it should be clear that in all six, the Framework provides for a degree of harmonisation, but not for uniformity. This is not an accident. When the RFEC was created, it was recognised that Member States had experienced different historic trajectories, and that they differed in important respects, notably in regard to the degree of competition in their respective markets. The RFEC therefore sought to create common rules, but not to ensure identical outcomes. These considerations continue to be relevant.

The need to promote connectivity at high and very high speeds is widely recognised today, but was less visible when the RFEC was last amended in 2009, and is not explicitly recognised as a regulatory objective; consequently, the tools to promote high speed connectivity in the RFEC are patchy and incomplete. This is an issue not only for the substantive domains we have studied, but arguably even more so for other substantive domains such as access regulation.

Rapid improvements in technology (including the availability of fixed and mobile broadband at progressively higher speeds) generate benefits for European consumers and firms, and mitigate numerous current policy concerns, but also creates new ones. Improved technology (1) has increased the demand for mobile broadband, thus also putting demands on spectrum management; (2) has enabled fibre-based broadband, thus also putting demand on access to land and rights of way (since new fibre needed to be deployed to replace existing copper); (3) has made it possible for largely unregulated so-called *Over-the-Top (OTT)* services that compete with regulated *electronic communication services (ECS)* to enter the market, raising concerns about possible competitive and regulatory asymmetries; (4) has enabled Machine-to-Machine communications and the Internet of Things (IoT), thus putting pressure on existing numbering arrangements; and (5) has enabled existing cable and satellite infrastructure to carry more channels, thus mitigating some of the concerns over scarcity and over competitive issues that had contributed to the need for 'must carry' rules, but also creating demand for higher bandwidth channels with the risk that scarcity might possibly re-emerge.

3.10 Index to candidate Action Lines

A summarised or abbreviated list of candidate lines, sequenced by candidate Action Line number, appears here, together with the number of the page on which the associated candidate Action Line appears.

Table 57: Summarised candidate Action Lines and the page where each appears.

Candidate Action Line 1: Require acceptance of a common Notification form in a widely spoken European language, such as English.	358
Candidate Action Line 2: Exempt ECS whose relevant turnover is below a defined threshold from the obligation to pay administrative charges.	358
Candidate Action Line 3: Clarify the definition of Electronic Communication Services (ECS).	360
Candidate Action Line 4: For release of WAPECs spectrum to the market, identify multiple milestones in order to enable timely infringement proceedings.	373
Candidate Action Line 5: Identify aspects of spectrum management that are regulatory tasks, and ensure that each is undertaken by an NRA.	374
Candidate Action Line 6: Establish criteria for the reserve price for auctions.	375
Candidate Action Line 7: In addition to ensuring that regulatory tasks for spectrum management are undertaken by an NRA, introduce a review and oversight role to a independent body at EU level (e.g. BEREC and/or the RSPG).	377
Candidate Action Line 8: As a radical alternative to Candidate Action Line 5 or 7, the Commission might itself assume many of the duties currently vested in the SMAs.	378
Candidate Action Line 9: Ensure that high quality training is widely available to SMA staff.	379
Candidate Action Line 10: The RSPG should conduct peer review of actions voluntarily submitted by the SMAs to strengthen SMA subject matter competence.	379
Candidate Action Line 11: Require Member States to maintain a public register of spectrum bands and locations that could potentially be available for trading.	380
Candidate Action Line 12: Empower the Commission to represent European interests before CEPT and the ITU in regard to numbering (as it does for spectrum).	388
Candidate Action Line 13: Revise the RFEC to note that although ETNS is inoperative, the needs that motivated ETNS continue to be of interest.	389
Candidate Action Line 14: Harmonise the the fees charged for access to land or granting of permits.	397
Candidate Action Line 15: Establish upper bounds for the stringency of EMF standards.	397
Candidate Action Line 16: Take steps to achieve greater harmonisation of sector-specific end-user provisions.	406
Candidate Action Line 17: Provide greater precision as to rules for contract renewal and for early termination of a contract, including in particular bundled services.	406
Candidate Action Line 18: As a radical alternative to Candidate Action Line 16 or 17, consider phasing out the USD's sector-specific protection of end-users altogether.	407
Candidate Action Line 19: Delete those sector-specific end-user protection provisions that overlap most with horizontal measures such as the CRD and ADR.	408

Candidate Action Line 20: Consider revising selected USD rules regarding end user rights to make them applicable to certain non-ECS OTT service providers.	409
Candidate Action Line 21: Extend the maximum contract duration for end-users of fast broadband lines in challenge areas.	410
Candidate Action Line 22: Exempt transmission platforms from 'must carry' obligations if the objectives are already met in some other way.	418
Candidate Action Line 23: Provide guidelines at European level for the level of remuneration for carriage from broadcasters to transmission platforms.	418
Candidate Action Line 24: Consider the radical Option of phasing out 'must carry' altogether.	419

3.11 Options to consider

This section represents a re-grouping of the candidate Action Lines into overall Options that address the Problem in the most likely Scenario.

We have not assessed the impacts of any Options, and we have not identified a preferred Option. We have, however, provided a comparison of anticipated advantages and disadvantages of the Options in Section 3.11.3.

3.11.1 The Options

The Options, from smallest to greatest intervention, are:

- **Baseline scenario:** In keeping with Impact Assessment methodology and with the Commission's Better Regulation Guidelines, a baseline Option provides a baseline against which all other Options could potentially be measured. In Table 58, the leftmost column is "greyed out" because no Action Lines at all are associated with the baseline scenario Option. It is, by definition, the Option where no new policy initiatives are undertaken.
- **Modest, incremental improvements:** A second Option groups together Action Lines that go beyond current practice, but without necessitating a substantial, potentially disruptive overhaul of any existing arrangements.
- **Intensive improvements:** A third Option groups together Action Lines that promise greater improvement than in the second Option, even at some risk of disruption.
- **Elimination of certain provisions:** A fourth Option puts primary emphasis on elimination of existing elements of the RFEC, even at some risk that certain existing protections might be sacrificed. The goal is regulatory simplification, consistent with the Better Regulation principles put forward by the Commission.

Elimination of regulations, where feasible, may also reduce the risk of asymmetries between traditional services and newer, internet-based services. The essential elements of this Option include (1) elimination of sector-specific rules in support of the rights of end-users (placing reliance instead on horizontal instruments such as the Consumer Rights Directive); and (2) a phasing out of must carry regulation.

- **Centralisation to achieve consistency:** A fifth Option puts primary emphasis on centralisation of authority, seeking to achieve maximum regulatory consistency across the Member States but at some risk to the principle of subsidiarity. Consistency in areas where we have not proposed full centralisation might be provided by means of either tighter specification in regulations rather than directives, or by means of harmonising decisions or recommendations (i.e. under Article 19 of the current Framework Directive). This can be viewed as the most radical of the Options put forward.

Not all of the Options are desirable, and not all are feasible. In Section 3.11.3, we compare the Options and candidate Action Lines in terms of their anticipated advantages and disadvantages, and also identify those that are candidates for deletion.

Some of the Options could be viewed as being fairly radical. It is standard practice in an Impact Assessment to include Options that are fairly radical, even if most will prove in the end to be impractical. We are not providing a full Impact Assessment, but we are following the Commission's Better Regulation Guidelines, and we therefore take an approach consistent with the Commission's recommended process in defining Options. The Options, including the more radical Options, seek to collectively provide a useful thought model in support of the next steps of the process.

3.11.2 Relationship of individual candidate Action Lines to Options

Table 57 (which appears earlier in this chapter) indicates the page number on which each candidate Action Line and its underlying policy rationale are described in full.

In Table 58, we show which of the candidate Action Lines might potentially fit with each of the five Options. We do not necessarily expect that every candidate Action Line identified for a given Option would necessarily be selected, nor do we necessarily expect that the Commission's ultimate direction will map exactly to any of these Action Lines or Options.

The rows of Table 58 represent the candidate Action Lines, while the columns of Table 58 represent the five Options. Where a cell is shaded **dark blue**, it means that the Action Line is compatible with the overall goals of the Option. *Since we are not assessing costs and benefits, it does not necessarily mean that the Action Line is recommended* – that is a determination to be made by the Commission.

Cells that are shaded **red** are likewise compatible with the goals of the Option, but these are Action Lines that we view as particularly radical. In some cases, they play a defining role relative to the Option in which they appear. Again, whether they are to be pursued is a question for the Impact Assessment to determine.

Cells that are shaded **grey** are inconsistent with the Option in question. In the case of the baseline scenario Option, no Action Lines are to be pursued. In the case of Deregulation Option, if a group of existing measures are to be phased out, it might be inconsistent to simultaneously work to refine them. Likewise, if a function were to be centralised at European level, some actions at Member State level become irrelevant or inappropriate.

Cells shaded in **light red** are in principle compatible with the Option in question, but would be pre-empted if the **radical Action Line** in the same Option and thematic area were chosen. For instance, if the end-user protection aspects of the USD were to be phased out, many other promising potential refinements to those provisions would become irrelevant.

Table 58: Relationship of candidate Action Lines to Options.

Candidate Action Line		Baseline scenario	Modest, incremental improvements	Intensive improvements	Elimination of certain provisions	Centralisation to achieve consistency
Market Entry						
1	Require acceptance of a common Notification form in a widely spoken European language, such as English					
2	Exempt ECS whose relevant turnover is below a defined threshold from the obligation to pay administrative charges					
3	Clarify the definition of Electronic Communication Services (ECS)					

Candidate Action Line		Baseline scenario	Modest, incremental improvements	Intensive improvements	Elimination of certain provisions	Centralisation to achieve consistency
Scarce Resources: Spectrum						
4	For release of WAPECs spectrum to the market, identify multiple milestones in order to enable timely infringement proceedings					
5	Identify aspects of spectrum management that are regulatory tasks, and ensure that each is undertaken by an NRA					
6	Establish criteria for the reserve price for auctions					
7	In addition to ensuring that regulatory tasks for spectrum management are undertaken by an NRA, introduce a review and oversight role to a independent body at EU level (e.g. BEREC and/or the RSPG)					
8	As a radical alternative to Candidate Action Line 75, the Commission might itself assume many of the duties currently vested in the SMAs					
9	Ensure that high quality training is widely available to SMA staff					
10	The RSPG should conduct peer review of actions voluntarily submitted by the SMAs to strengthen SMA subject matter competence					
11	Require Member States to maintain a public register of spectrum bands and locations that could potentially be available for trading					
Scarce Resources: Numbers						
12	Empower the Commission to represent European interests before CEPT and the ITU in regard to numbering (as it does for spectrum)					
13	Revise the RFEC to note that although ETNS is inoperative, the needs that motivated ETNS continue to be of interest					
Scarce Resources: Access to Land and Rights of Way						
14	Harmonise the the fees charged for access to land or granting of permits					
15	Establish upper bounds for the stringency of EMF standards					

Candidate Action Line		Baseline scenario	Modest, incremental improvements	Intensive improvements	Elimination of certain provisions	Centralisation to achieve consistency
End-User Rights						
16	Take steps to achieve greater harmonisation of sector-specific end-user provisions					
17	Provide greater precision as to rules for contract renewal and for early termination of a contract, including in particular bundled services					
18	As a radical alternative to Candidate Action Line 16 or 17, consider phasing out the USD's sector-specific protection of end-users altogether					
19	Delete those sector-specific end-user protection provisions that overlap most with horizontal measures such as the CRD and ADR					
20	Consider revising selected USD rules regarding end user rights to make them applicable to certain non-ECS OTT service providers					
21	Extend the maximum contract duration for end-users of fast broadband lines in challenge areas					
Must Carry and EPG rules						
22	Exempt transmission platforms from 'must carry' obligations if the objectives are already met in some other way					
23	Provide guidelines at European level for the level of remuneration for carriage from broadcasters to transmission platforms					
24	Consider the radical Option of phasing out 'must carry' altogether					

3.11.3 Comparison of anticipated advantages and disadvantages of the Options

We have not attempted to identify a preferred Option; however, we have considered the anticipated advantages and disadvantages of each Option. We consider the five Options in turn, and also consider various Action Lines within the Options where appropriate.

In the assessment in this section, we do not repeat the rationale for each individual candidate Action Line, since that the rationale in each case was already presented earlier in this chapter as each candidate Action Line was first presented.

3.11.3.1 Baseline scenario

It is routine under the Better Regulation Guidelines⁴⁵⁴ to include an Option that serves as a baseline for comparison for any further policy interventions. In this case, the baseline scenario Option is not a conspicuously bad Option, in that many of the aspects of the RFEC that have been assessed in this study are functioning reasonably well overall; however, one can still do better.

The chief critique of the baseline Option is indeed that it fails to correct the correctable problem elements that have been identified, and fails to achieve the gains that can be achieved by some of the other Options – some of which are relatively easy to implement, and fairly unambiguous in their ability to generate benefits. It is not the best Option.

3.11.3.2 Modest, incremental improvements

The “modest, incremental improvements” Option groups together a number of candidate Action Lines that generate clear benefits and are relatively low cost and uncontroversial.

For market entry, for example, Member States would be required to accept a standardised notification in one or more of the most commonly used EU languages, thus greatly simplifying the Notification process for firms that wish for the first time to achieve market entry in multiple Member States. Long-standing ambiguities as to whether firms that do not themselves incorporate 'conveyance of data', or that enable calls to E.164 numbers, need to notify, would be clarified and harmonised. For spectrum management, training in auction procedures would be made available to SMAs, and the RSPG would launch a programme where SMAs could voluntarily submit actions they have undertaken for peer review. As regards end-user rights, ambiguities regarding renewal or cancellation of bundled services (possibly with some ECS and some non-ECS services) would be clarified. The full list appears in Table 58.

This Option is clearly superior to the baseline scenario Option, does not include any mutually incompatible Action Lines, and generally seems quite workable.

3.11.3.3 Intensive improvements

The “intensive improvements” Option goes beyond the “modest, incremental improvements” Option. It potentially produces greater gains; however, some of the candidate Action Lines are more disruptive, less certain in their effects, or may require greater political will to implement.

⁴⁵⁴ European Commission (2015), Better Regulation Guidelines, SWD (2015) 111.

In terms of spectrum management, for instance, one of the candidate Action Lines would seek to identify a class of spectrum assignment decisions that should in principle be objective regulatory decisions, insulated from political and governmental considerations (the setting of the auction reserve price being the most notable example). A further candidate Action Line would make certain of these regulatory decisions subject to independent review, perhaps by BEREC, or else by an RSPG that had been transformed to assume BEREC-like competencies. The logic of these candidate Action Lines is obvious, the benefits are clear, but they potentially disrupt the long-standing distribution of competencies between the Member States and the European institutions.

In our assessment of access to land and rights of way, we have included a potentially controversial candidate Action Line that would limit the ability of Member States or municipalities to put EMF limits more restrictive than those recommended for Europe as a whole without a valid scientific basis. EMF is a topic that tends to be ignored because it spans different areas of public policy, and also different Directorates within the Commission. EMF is not part of the RFEC, but it clearly impacts the ability to deploy ECS infrastructure (for instance, masts), and therefore is definitely of interest for our study. Once again, we would suggest that the logic of this candidate Action Line is obvious, the benefits are clear, but any re-balancing of conflicting goals and interests both at European level, and between the European and the Member State / municipal level, would be possible only with political will.

In sum, this “intensive improvements” Option is superior in many respects to the “modest, incremental improvements” Option; however, it incorporates harder decisions. Decisionmakers would need to carefully consider a number of the individual candidate Action Lines in this Option. We leave these choices to the decisionmakers.

3.11.3.4 Elimination of certain provisions

This Option, which places a high priority on selective elimination or phasing out of specific measures, groups together a small number of rather controversial initiatives.

As regards end-user rights, this Option includes a candidate Action Line to phase out the USD’s sector-specific protection of end-users altogether. The rationale would be that many of the objectives of the sector-specific end-user protection provisions of the Universal Service Directive are now embodied in roughly comparable horizontal measures such as the Consumer Rights Directive.

This approach merits consideration, but our assessment is that instead pursuing Candidate Action Line 19 (selective withdrawal of those USD end-user protection rules that overlap most with horizontal instruments) is likely to be the better choice. Complete withdrawal would mean that protections now available to business end-users would disappear (because measures such as the CRD protect only consumers), and would

also eliminate a number of sector-specific protection measures that end-users use and value today.

As regards ‘must carry’ rules, this Option proposes the elimination of ‘must carry’. Doing so would necessarily go beyond the elimination of the relevant provisions in the RFEC (notably Article 31 of the Universal Service Directive), since doing so would not eliminate the provisions that implement ‘must carry’ at Member State level. Again, we think that this Option merits discussion, but is probably not the best way forward. First, it is not clear how ‘must carry’ could be eliminated in practice, since Member State rules do not depend on the RFEC. Second, even though technological changes have mitigated the scarcity that drove competitive concerns that represent a key justification for ‘must carry’ rules, they have not mitigated concerns over media pluralism and freedom of expression, the second major reason for ‘must carry’. Further, the elimination of scarcity has not had the same effect in all Member States, and there is no guarantee that it might not reverse as consumers take up audiovisual media formats that may possibly require higher progressively effective bandwidth.

Overall, even though there is a logical basis for the main candidate Action Lines that comprise this Option, our sense is that it is more disruptive, less effective, and overall less desirable than the “modest, incremental improvements” and the “intensive improvements” Options.

3.11.3.5 Centralisation and consistency

The “centralisation and consistency” Option goes further than the “intensive improvements” Option in seeking to centralise and harmonise authority at European level. Most notably, it would seek to transfer many of the spectrum management decisions that are currently made by SMAs at Member State level to the European level.

As noted, it is not clear that this candidate Action Line actually solves the corresponding Problem element, rather than merely moving it. Centralising authority with the Commission does not in and of itself address the root problem, which is ensuring that spectrum management decisions are objectively and independently reviewed.

There is also the risk that European authorities might not be sufficiently knowledgeable about Member State specificities.

Aside from that, this approach would be highly disruptive relative to current arrangements.

Many of the individual candidate Action Lines in the Option are appropriate, but our sense is that a nuanced approach to centralisation is best, with due recognition of the

principle of subsidiarity, and with due appreciation for the notion that *what* is centralised, as well as *how*, both matter.

3.11.3.6 Overall assessment

We consider that a judicious selection of Action Lines from the “intensive improvements” Option is likely to produce better results than remaining with the baseline scenario, and also better results than any of the other Options. The measures put forward are likely to be effective and efficient, and they are consistent with the principles of proportionality and subsidiarity. Their superiority appears to hold both under the most likely and the various disruptive scenarios of future evolution that we consider. Other Options promise more radical benefits on individual Action Lines, which may enjoy considerable support among certain stakeholders, but compare less favourably on balance in terms of effectiveness, proportionality and/or subsidiarity.

3.12 A snapshot of the key findings and conclusions

On the basis of the analysis carried out in this study, we conclude that the RFEC is functioning well overall in the substantive domains that we have examined. Existing RFEC provisions already deal with a wide range of concerns, and Member State staff that implement the RFEC appear in most cases to have good subject matter knowledge and to understand Member State specificities. There is nonetheless room for improvement.

There are both positive and negative aspects to the fact that most aspects of the RFEC are subject to only minimal harmonisation (see Section 3.9). On the positive side, NRAs/SMAs are able to accommodate Member State specificities well where appropriate. In each of the substantive domains that we have studied, however, divergence among the Member States is substantial. Some aspects of this divergence are harmful, impacting network operators, service providers, and/or end users that operate in multiple Member States.

Rapid technological change in the sector likewise has both positive and negative implications. Technological progress brings benefits to Europeans, and mitigates some of the concerns that drove the need for regulation in the first place; however, technological progress often brings with it new challenges. Key challenges are:

- A need to promote connectivity with very high capacity, which was not explicitly recognised as a regulatory objective when the RFEC was last amended in 2009.
- The emergence of non-ECS OTT services that compete with ECS.

- The growing use of bundled services.
- Emergence of Machine-to-Machine (M2M) communications and the Internet of Things (IoT).

It is for the Commission to determine what use to make of the Options that we have identified to address the challenges that we have noted throughout. Our sense is that a judicious selection of candidate Action Lines from the Option that we have referred to as “intensive improvements” is most promising, and is likely to yield improvements relative to current arrangements (see Section 3.11.3, and especially Section 3.11.3.6).

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4.2.1 EU level

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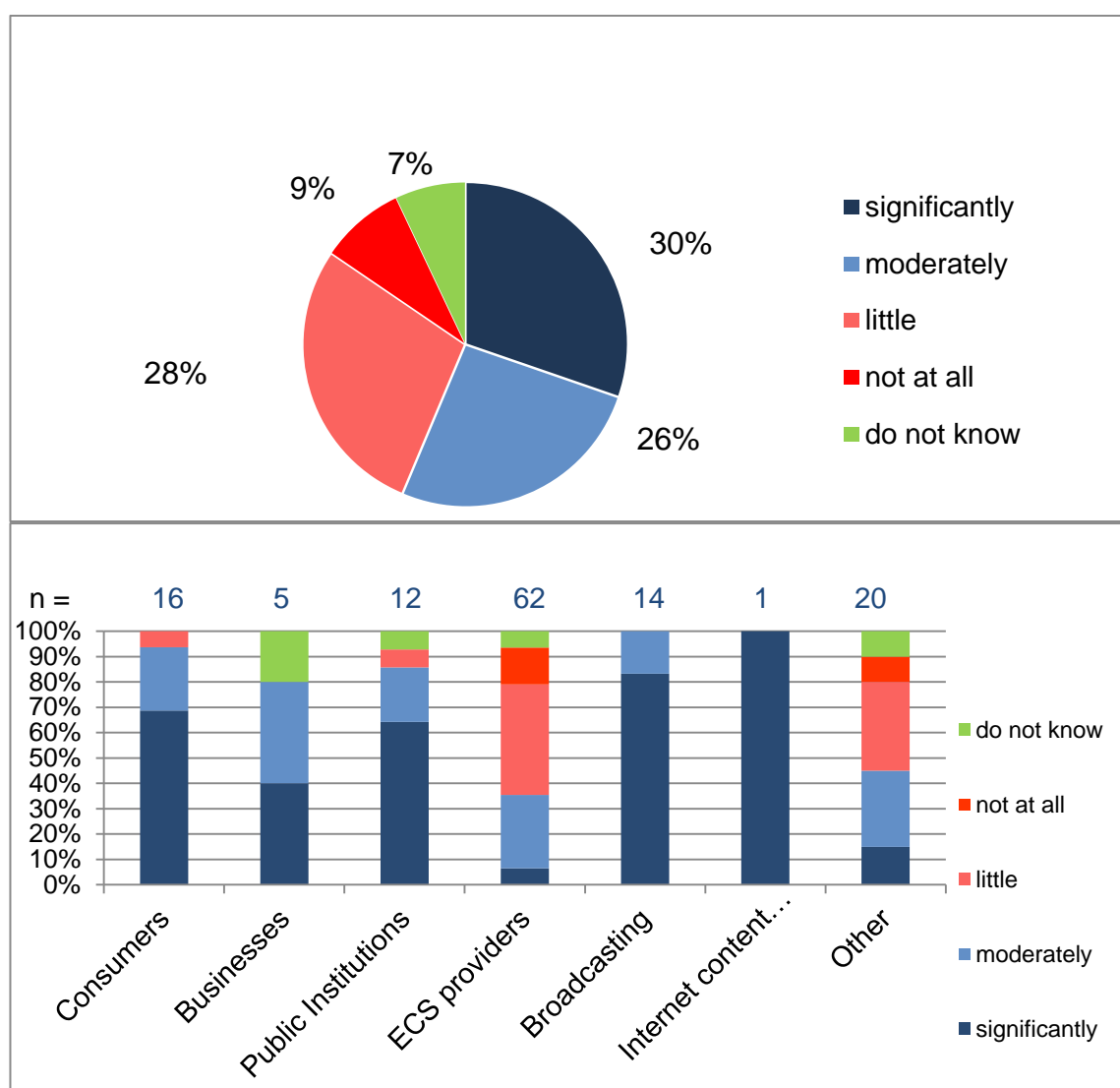
5 Appendices

5.1 Selected results from public consultation on review of RFEC

5.1.1 Commission consultation responses on need to maintain sector-specific end-users' protection

Figure 65: Responses to Question 12b – All respondents (n = 142)

Question 12: As regards EU added value of the regulatory framework for electronic communications, to what extent is there still a need to continue action at EU level by maintaining/establishing sector specific legislation for: b) Universal service and end-users' protection



5.1.2 Commission consultation responses on number portability

Figure 66: Responses to Question 104 – All respondents (n = 104)

Question 104: Number portability is part of the numbering resource management and also an important tool to remove barriers to switching. It thereby facilitates end-users' choice and change of providers and stimulates competition. To what extent do the current provisions on number portability as established in Article 30 of the Universal Service Directive allow for their efficient implementation?

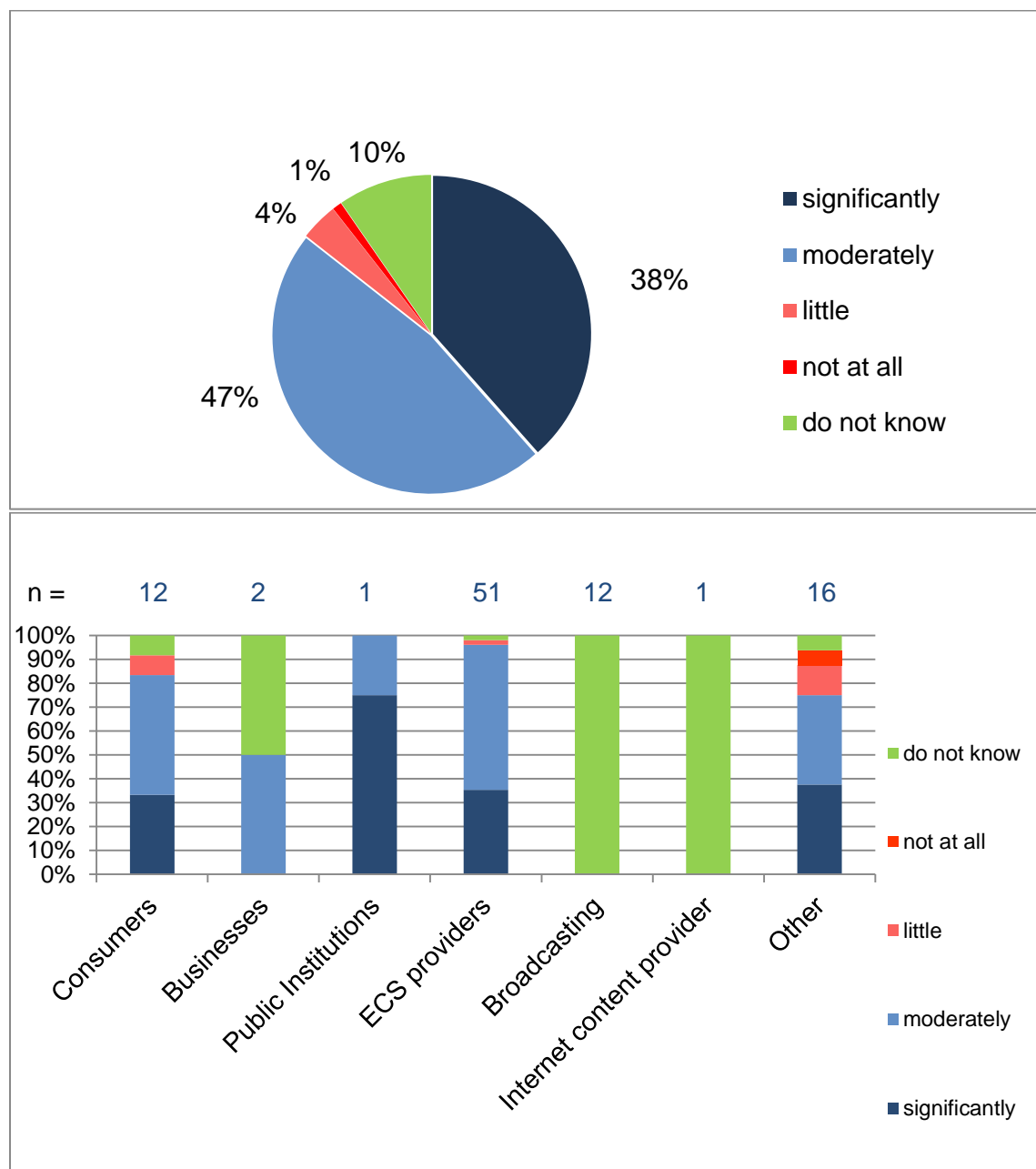


Figure 67: Responses to Question 131 – All respondents (n = 101)

Question 131: Should the scope of the number portability regime be adapted to new technology and market developments and apply also to elements other than telephone numbers which may be obstacles to the switching of providers of communications services, for instance to allow moving content stored by end-users with communications service providers?

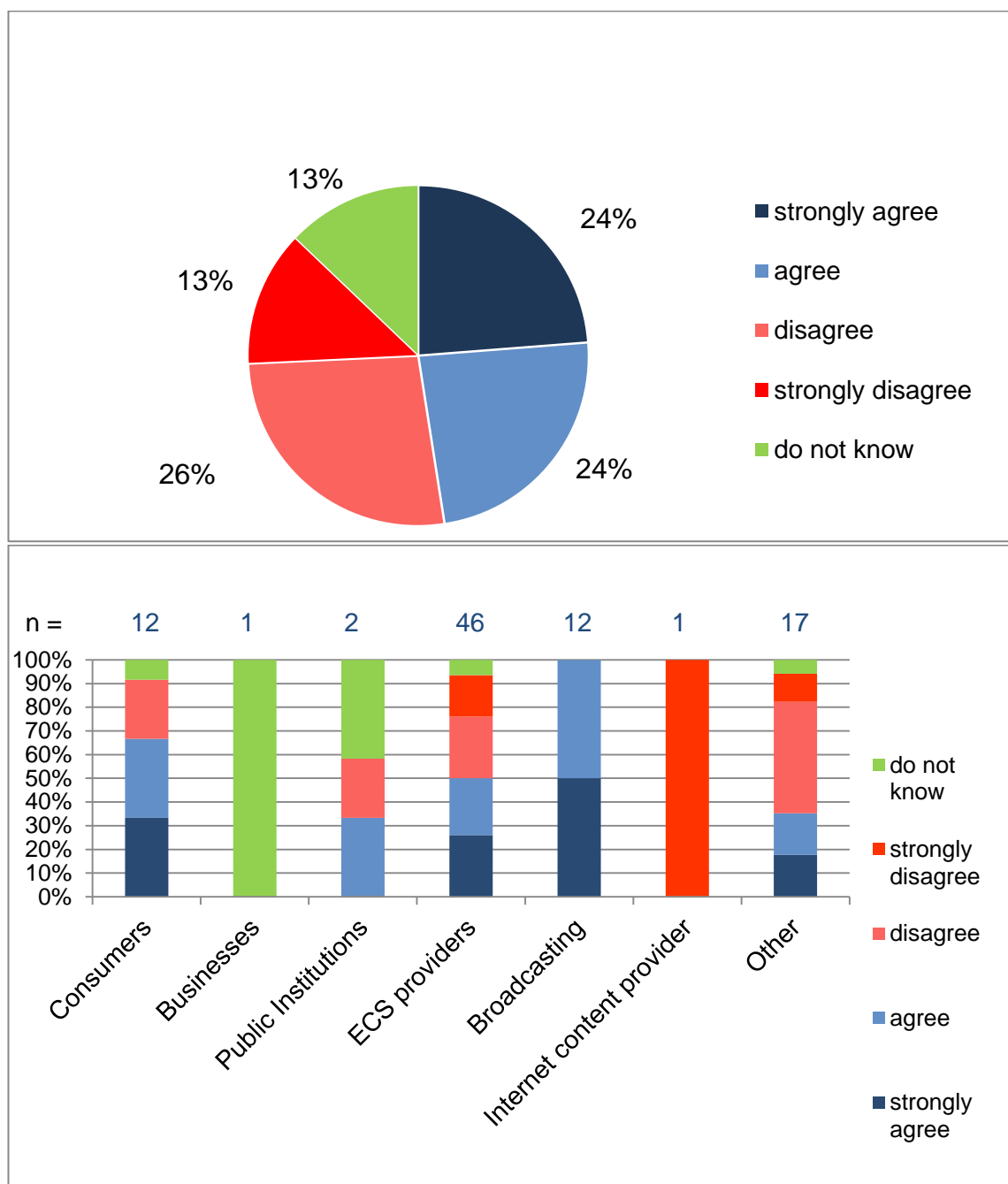
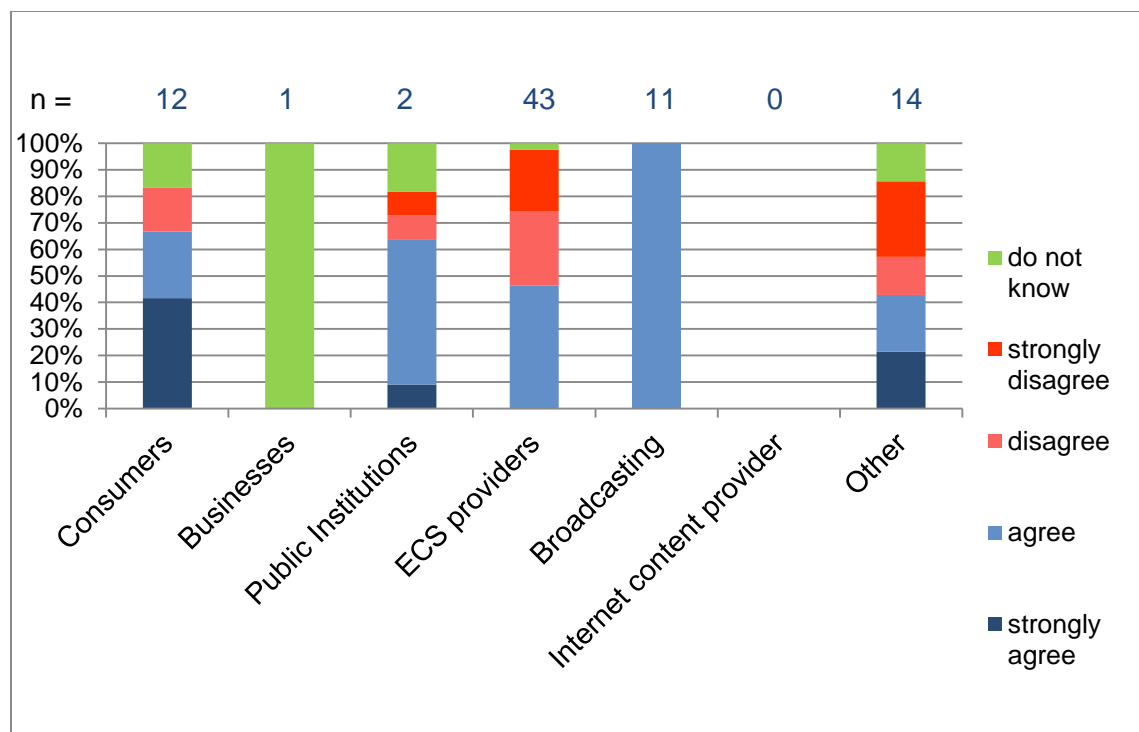
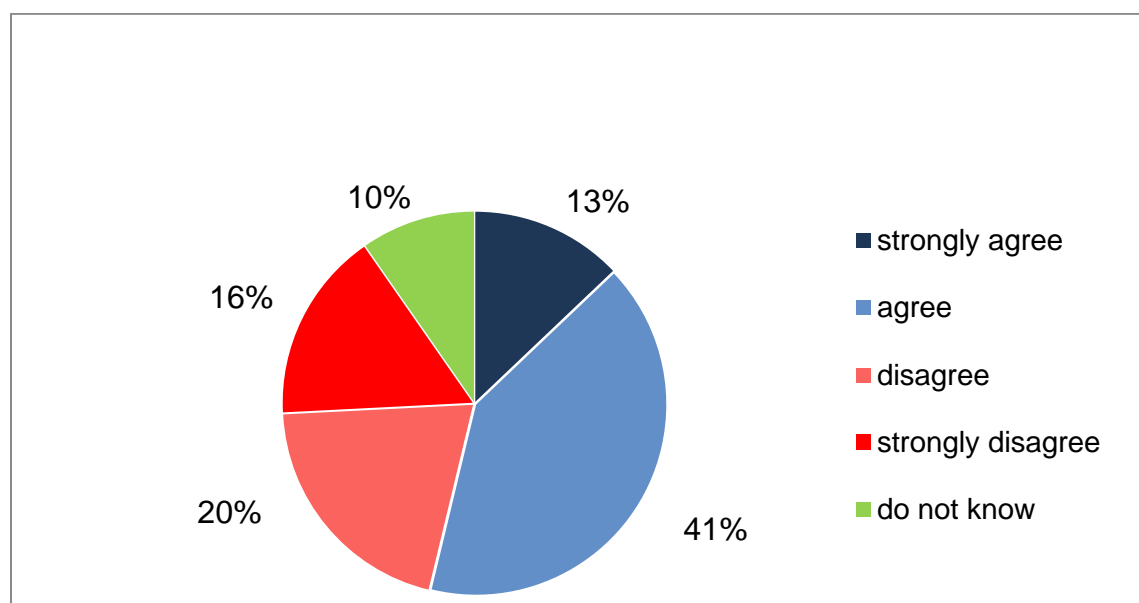


Figure 68: Responses to Question 132 – All respondents (n = 93)

Question 132: Is there a need to adapt the current rules on change of provider (switching) in view of the increasing importance of bundled offers consisting of (i) several communications services or (ii) a combination of communications services and other services?



5.1.3 Commission consultation responses on alternative dispute resolution

Figure 69: Responses to Question 179 – All respondents (n = 86)

Question 179: As regards the enforcement of EU communications sector-specific end-user rights, should the enforcement of EU communications sector-specific end-user rights at national level fall within the core competence of the independent national regulatory authorities for communications?

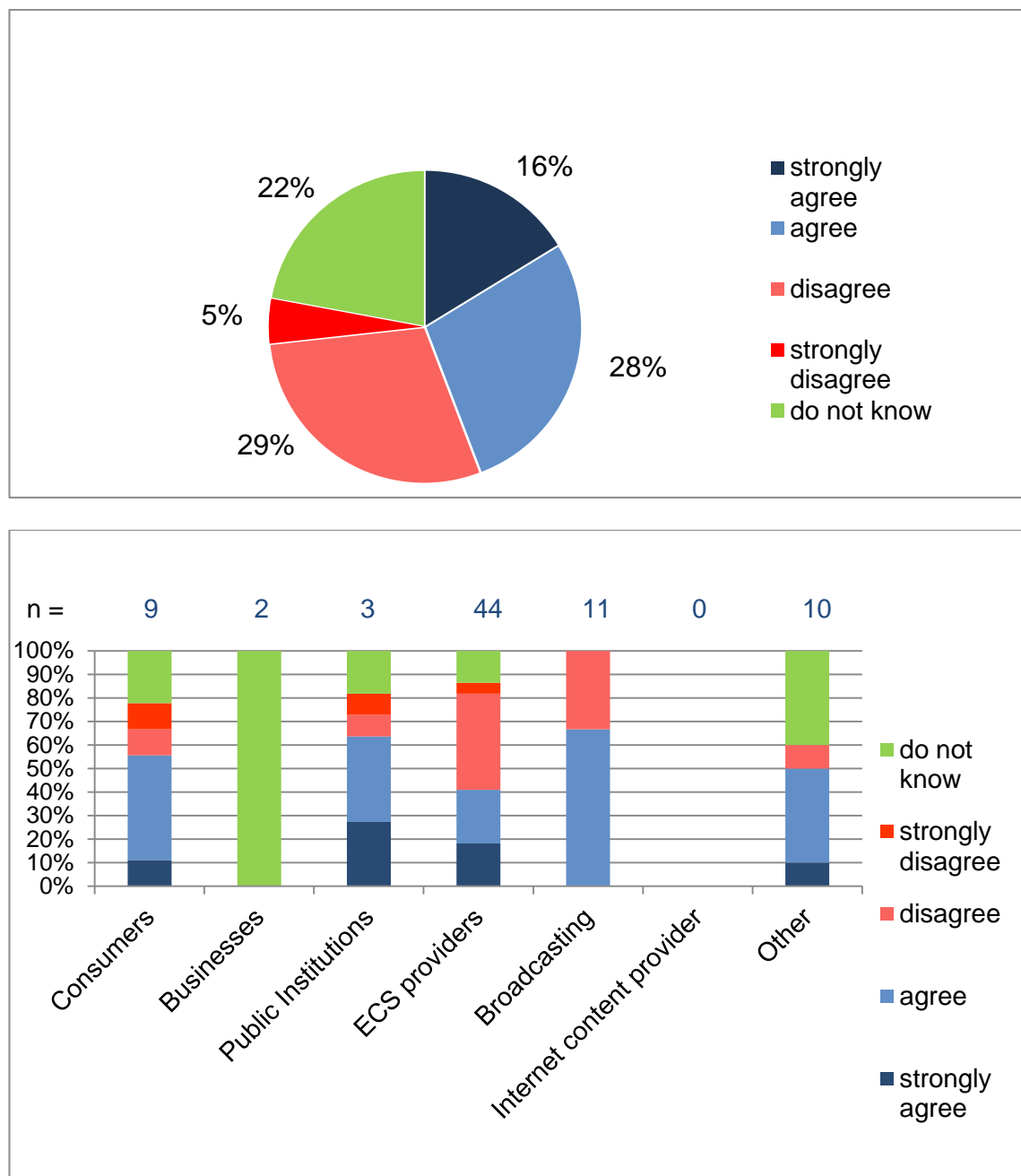
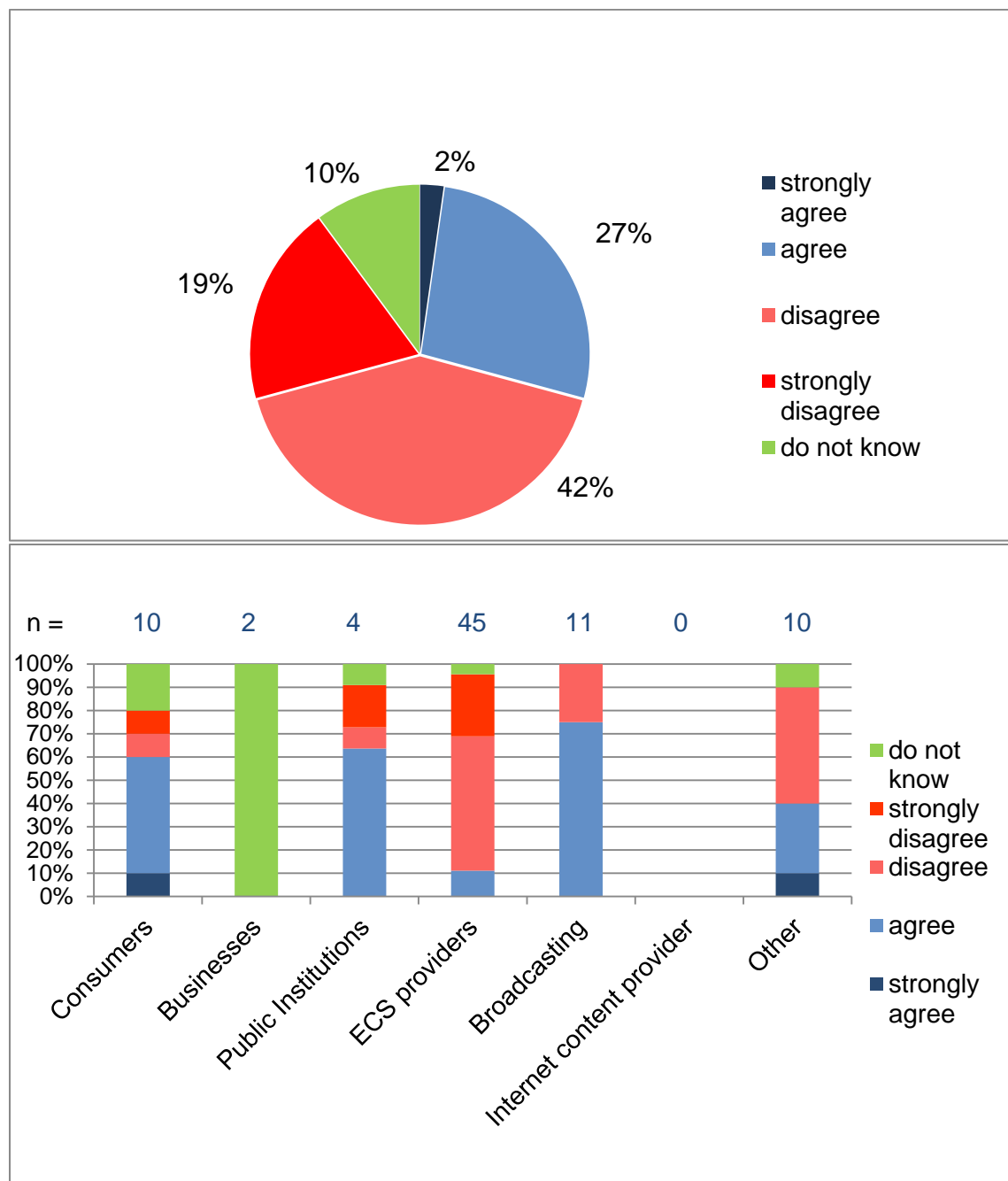


Figure 70: Responses to Question 180 – All respondents (n = 89)

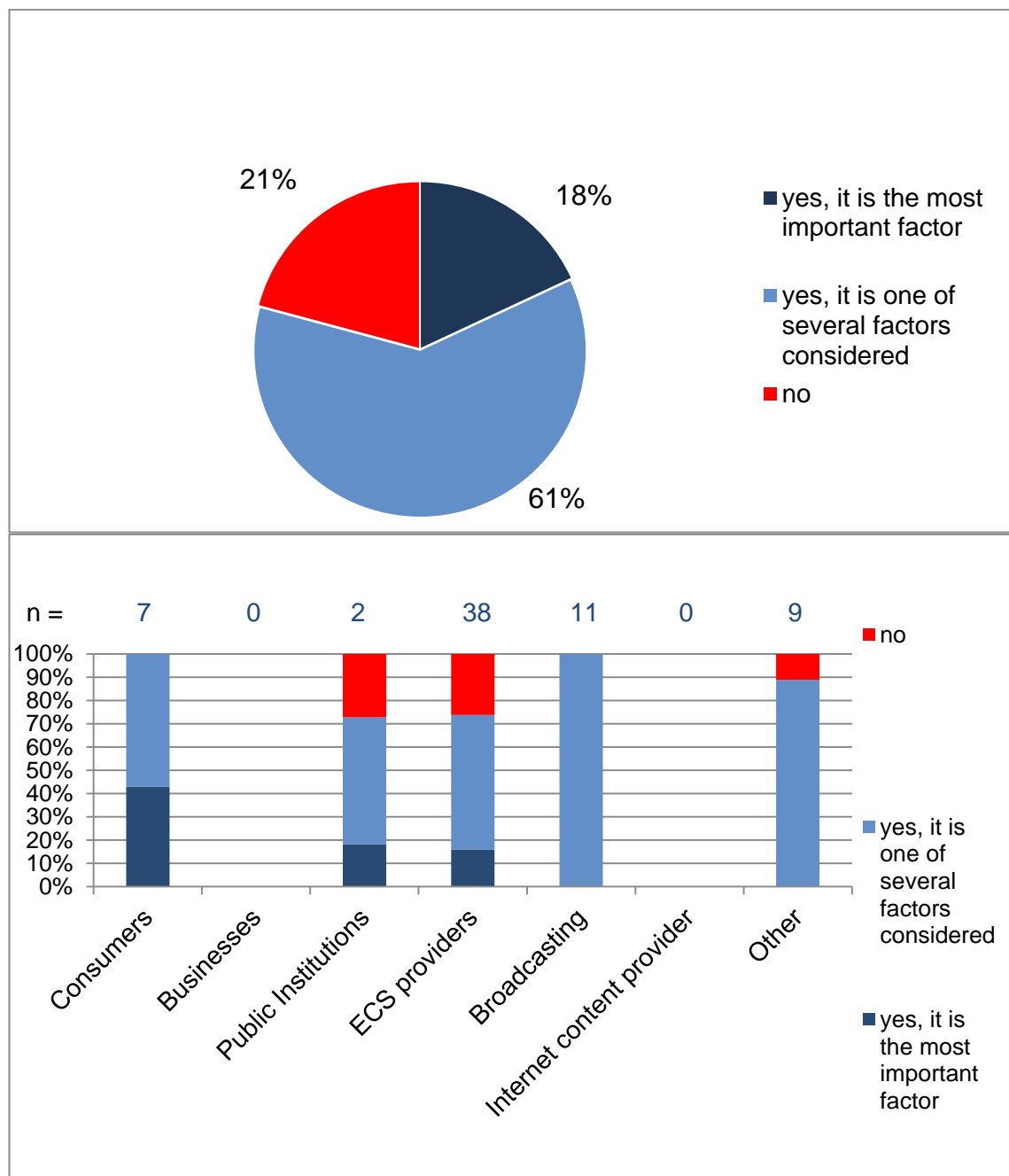
Question 180: As regards the enforcement of EU communications sector-specific end-user rights, should other national authorities (also) be competent for the enforcement of EU communications sector-specific end-user rights?



5.1.4 Commission consultation responses on harmonisation

Figure 71: Responses to Question 181 – All respondents (n = 72)

Question 181: As regards the enforcement of EU communications sector-specific end-user rights, does the degree of harmonisation of the EU communications sector-specific end-user rights (maximum/minimum harmonisation) play a role in your reply to the previous questions?



5.2 List of additional stakeholder interviews and questionnaire

5.2.1 List of stakeholders interviewed

- ACM
- BELTUG / INTUG
- BEUC
- BT
- CCIA
- CISCO
- Communications Consumer Panel / Faster Payments
- ComReg
- Deutsche Telekom
- EBU
- Ericsson
- GSMA
- Iliad
- Liberty Global
- Ofcom
- ORANGE
- RSPG Chair
- Sky
- Tele 2
- Vodafone

(Note: Some entities have chosen to respond only to certain parts of the questionnaire.)

5.2.2 Questionnaire for stakeholder interviews

- Questionnaire

Substantive issues for review in
the areas of market entry,
management of scarce resources
and general end-user issues

SMART 2015/0003

Stakeholder Questionnaire

WIK-Consult GmbH
Rhöndorfer Str. 68
53604 Bad Honnef
Germany

14 March 2016



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Introduction

WIK-Consult is undertaking, in conjunction with Cullen International and Centre de Recherche Information, Droit et Société (CRIDS) of the University of Namur, a study on '*Substantive issues for review in the areas of market entry, management of scarce resources and general end-user issues*' (SMART 2015/0003) on behalf of the European Commission, DG Connect. The study will contribute evidence and analytical insights in support of the Commission's ongoing review of the regulatory framework for electronic communications with a specific focus on market entry, access to scarce resources (spectrum, numbers and rights of way), end-user issues, and the institutional framework.

In the context of this study, we are conducting interviews with a number of organisations in order to contribute to an evidence base for the evaluation of the existing regulatory set-up relating to (1) market entry, (2) management of scarce resources, and (3) end-user issues (including in each case associated governance mechanisms), as well as to help in identifying potential alternative options for the future.

The below questions take account of the public consultation on the review of the regulatory framework for electronic communications in fall 2015 and will be considered alongside the responses to that consultation. We invite you to expand on any points you may have made in response to that consultation, and to add supporting evidence wherever possible (for example, through reference to specific cases or quantitative analyses).

Wherever you propose changes to existing arrangements, please outline the possible costs and benefits and quantify them where possible.

We will prepare notes based on the interview. You will be given an opportunity to review them. The reviewed notes will be shared with Commission staff, and may also be used for another study that supports the preparation of the impact assessment for the review of the regulatory framework for electronic communications.⁴⁵⁵ All staff handling interview data are subject to confidentiality obligations. The Commission protects confidential business information in line with Regulation 1049/2001.

The information and views that you provide in the interview may be referred to or quoted in either or both studies. Quotations only refer to the nature of the organisation that you represent. Under no circumstances will we publicly identify the individuals or firms that provided the interview information or views, unless you explicitly authorise us to do so. If you agree to be identified, please mention this to the interviewer and indicate to which items your agreement relates.

⁴⁵⁵ Support for the preparation of the impact assessment accompanying the review of the regulatory framework for e-communications (SMART 2015/0005). Some WIK staff are engaged in both projects.

1. Your organisation

1.1 Please describe the nature of your organisation

- a Which kind of organisation or company(ies) do you represent [e.g. business end-user / consumer / telecoms operator / equipment manufacturer / content and/or application provider]?
- b In which EU countries do you operate? Is your business locally or nationally focused or does it have a cross-border, pan-European or global dimension?
- c What is the size of your workforce and turnover or that of the companies which you represent?

2. Provisions on end-user issues⁴⁵⁶ and associated governance

2.1 Existing provisions

- 2.1.1. To what extent have the provisions on end user rights achieved their goal of ensuring a high level of end-user (and especially consumer) protection in the electronic communications sector across the EU?
- 2.1.2. Are the current provisions sufficient? Can you identify areas or problems where they are insufficient or perhaps too numerous?
- 2.1.3. Does your organisation go beyond these legal provisions (e.g. for commercial reasons)? If so, please indicate the relevant provisions, and explain how your organisation goes beyond them.
- 2.1.4. How effective are the number portability provisions? Are they too burdensome for operators? Do you for instance have concerns over the provisions on delays, disruption, loss of service, cost for end-users, or slamming and telephone service change without subscriber's consent?
- 2.1.5. As regards consistency in the implementation across the EU of end-user-related provisions:
 - Has the current sector-specific end-user provisions (based on the principle of minimum organization⁴⁶⁷) led to a fragmented level of end-user protection across the EU? Please elaborate. Has this led to complications for the cross-border provision of services?
 - How important is consistent implementation among the Member States to your organization?
- 2.1.6 With regard to the possible overlap between sector specific end-user provisions and general EU consumer protection law:

⁴⁵⁶ The Universal Service Directive establishes a range of end-user rights. It details the clauses that consumer contracts must contain and limits maximum contract duration to 24 months while requiring operators to offer users the possibility to subscribe to a contract with a maximum duration of 12 months. Moreover, operators are obliged to implement number portability within one working day at most. In addition, national regulators are empowered to impose: (i) the publication of transparent, comparable, information on applicable prices and tariffs, (ii) the unpaid distribution of information to subscribers, on for example the dissemination of harmful content, including infringements of copyright and related rights, (iii) the publication of comparable, adequate and up-to-date information for end-users on the quality of their services and on measures taken to ensure equivalence in access for disabled end-users, (iv) simple and inexpensive out-of court procedures dealing with unresolved disputes between consumers and telecommunication services providers. The Universal Service Directive also imposes a number of obligations on providers of Publicly Available Telephone Services (PATS) in favour of their customers, such as the right to be included in telephone directory services (Art. 25) or to benefit from additional facilities such as calling line identification (Art. 29).

- Can you identify any sector specific provisions that you no longer consider relevant because they are wholly or in essence covered by general EU consumer protection law? If so, please specify these provisions.
- Is general EU consumer protection law applicable to distance contracts or off-premises contracts sufficient to ensure a high level of protection to the benefit of consumers in the field of electronic communications? What about general alternative and online dispute resolution processes? Should there be additional sector-specific legal provisions in this sector?

2.2 Future provisions

2.2.1 What are the main market- and technological developments you foresee in the coming 5-10 years which may have an impact on the required end-user protection regime?

2.2.2 Are there end-user protection issues for which provisions should be added to sector-specific regulation or to general EU consumer protection law?

2.2.3 Which sector-specific end-user provisions should apply in future? Please distinguish among:

- Contractual information (e.g. related to quality parameters other than speed in internet access services)
- Transparency measures
- Independent price and quality comparison tools
- Control of consumption
- Contract duration
- Contract termination
- Measures facilitating switching
- Measures eliminating restrictions and discrimination based on nationality or place of residence
- Other (consider also the increasing importance of bundled offers in the above points)

How important is:

- the option for Member States to add additional requirements (for specific issues) to the sector-specific regulation?, and
- the increasing importance of bundled offers in this respect?

- 2.2.4 Should different approaches be considered for regulating end-user issues in respect to traditional ECS, Internet Access services, and functional substitutes to ECS (such as OTT services)? For which of these would it be appropriate to rely solely on general EU and/or national consumer protection law?
- 2.2.5 In general, should sector-specific end-user provisions (whether existing, amended or new) aim at minimum harmonisation, full harmonisation, or minimum harmonisation at a very high level?
- 2.2.6 Should network operators be allowed to extend maximum contract duration beyond 24 months or other measures (such as specific one-time payments) in areas where deployment of very high capacity networks is challenging, so as to incentivise roll-out?
- 2.2.7 Should the scope of the number portability regime be adapted to new technology and market developments? Should the scope be extended to apply to elements other than telephone numbers which may be obstacles to the switching of providers of communications services (for instance, to enable end-users to port cloud content)?
- 2.2.8 Is there a need to adapt the current provisions on change of provider (switching) in view of the increasing importance of bundled offers consisting of (i) several communications services or (ii) a combination of communications services and other services, including content?
- 2.2.9 What changes, if any, are needed to the alternative dispute resolution (ADR) procedures available to consumers for telecommunication services under the regulatory framework for electronic communications and considering horizontal rules? Are consumers sufficiently aware of these procedures? Do you inform consumers about ADR procedures, and if so, how?

3. “Must-carry”⁴⁵⁷ and findability obligations⁴⁵⁸

3.1 Existing provisions

3.1.1 In respect to the existing must-carry and findability provisions, could you provide information on the benefits versus disadvantages and costs?

3.2 Future provisions

3.2.1 Do you think that must-carry provisions are still necessary or useful? Has the increase in the number of channels available (over cable television and also Internet) made them less relevant? Should they be amended, or instead be replaced by provisions ensuring the findability of media content?

3.2.2 If must-carry obligations were to be maintained in the future,

- On whom should they be imposed,
- What should be their scope with regard to the contents covered, and
- Who should be the beneficiaries?

3.2.3 What would be the burden for the addressees and what would be the advantages for the beneficiaries? How would you quantify each?

3.2.4 What procedural safeguards should be applied in regard to must-carry, if any? What would be the benefits and what would be the administrative and compliance costs?

3.2.5 If the function of must-carry provisions were to be maintained, should this be done through the regulation of electronic communications or through other EU regulations (for instance, rules for audiovisual media services or platforms)? What should be the role of rules on Electronic Programme Guides in this respect?

457 ‘Must-carry’ obligations are obligations on the network operator to carry specific content for the transmission of specified TV and radio channels. Must-carry rules may be imposed by Member States in the public interest on providers of electronic communications networks. The scope of current obligations is limited by the requirement that a significant number of end-users use the electronic communication network(s) concerned as their principal means to receive TV and radio broadcast channels.

458 In the current framework, Member States can impose obligations under the Access Directive regarding the presentational aspect of electronic programme guides and similar listing and navigation facilities. ‘Findability obligations’ here are more broadly understood as any kind of obligation facilitating targeted access to content services conveyed over electronic communications networks.

4. Provisions on access to spectrum and associated governance

4.1 Existing provisions

4.1.1 What, in your experience, are the key problems with the current spectrum management arrangements in the EU?

4.1.2 What impact do these problems have on businesses and/or consumers in terms of

- inefficient spectrum use
- lower competition
- limited development of cross-border services
- investment in mobile network infrastructure
- differences in coverage and quality of service across Member States
- slow take-up of wireless innovation (services & equipment)
- higher consumer prices?

4.1.3 What benefits and/or costs have been associated with the awarding of wireless electronic communications spectrum at the national level based on general principles of the Framework Directive? Please provide concrete examples and where possible quantify the (positive or negative) impacts on your organisation or the companies or users you represent or analyse. Please distinguish between:

- a. determination of the type of selection process (auction, beauty contest, first come first served, hybrid model);
- b. timing of selection processes;
- c. packaging of lots;
- d. specific measures to promote competition such as spectrum caps/floors and new entrant spectrum reservation;
- e. spectrum valuation and determination of reserve prices;
- f. determination of payment modalities.

4.1.4 What benefits and/or costs have been associated with the determination of usage conditions for wireless electronic communications spectrum at the national level? Please provide concrete examples and where possible quantify the (positive or negative) impacts on your organisation or the companies or users you represent or analyse. Please distinguish between:

- a. duration of the licenses;
- b. conditions for renewal;

- c. possibility to trade or lease spectrum;
- d. possibility to share and pool spectrum;
- e. infrastructure sharing;
- f. coverage obligations;
- g. MVNO access conditions.

4.1.5 What benefits and/or costs have been associated with making the use of spectrum more flexible? Please provide concrete examples and where possible quantify the (positive or negative) impacts. Please distinguish between:

- a. refarming,
- b. tradability and leasing of spectrum;
- c. shared access to spectrum such as using white spaces and spectrum pooling;
- d. incentive auctions;
- e. "use it or lose it" clauses.

4.1.6 Is consistency in spectrum-related provisions and their implementation across the EU important to you?

- a. If so, please identify where and when consistency matters (most) and illustrate why through concrete examples, and quantify the benefits to your organisation or those you represent to the extent possible.
- b. If not, please give reasons, and provide evidence where applicable.

4.1.7 Is the current institutional set-up of awarding wireless spectrum, determining usage conditions and increasing flexibility of spectrum use effective, efficient and coherent?

- a. How would you evaluate the effectiveness of the current processes? Please provide evidence through relevant cases. What (positive or negative) impact have national selection processes and usage conditions had on your organisation or those you represent or analyse?
- b. Are the roles of the different institutions involved in the application and monitoring of the spectrum provisions of the EU telecom framework (Spectrum Management Agencies, European Commission, RSPG) clear and unambiguous? Is the allocation of responsibilities and authority efficient and appropriate? To what extent does the existing set-up provide regulatory certainty and predictability for your organisation or those you represent or analyse? Do you perceive any mis-matches between current institutional arrangements and overall European policy goals? Please give reasons.

- c. To what extent has the current governance for spectrum efficiently and effectively contributed to the deployment of wireless broadband networks across the EU?

4.2 Future provisions

4.2.1 How do you think the problems of spectrum management in the EU and their associated impacts will evolve in the next 10 years given current trends in spectrum demand and the development of 5G?

4.2.2 What changes would you envisage to the institutional set-up in relation to assignment procedures and usage conditions with a view to provide greater regulatory predictability and legal certainty, to promote the deployment of high-speed mobile broadband networks, or to remove barriers to competition across the EU?

- a. Should there be more EU-level guidance to national Spectrum Management Agencies (SMAs) in relation to assignment procedures, usage conditions, and the timing in which spectrum is made available to those who need it?
- b. What is/are the most suitable mechanism(s) for providing EU-level guidance to Spectrum Management Agencies:
 - Commission recommendations under Article 19 of the Framework Directive
 - Commission implementing decisions mechanism similar to that set by Article 4 of the Radio Spectrum Decision
 - RSPG Guidelines
 - BEREC common positions
 - Alternatively, should these functions be subsumed into an EU-level Spectrum Management Authority (SMA)? If so, what should its competence be?
 - Anything else?
- c. Should there be a peer review of SMA assignment procedures and usage conditions under an EU institution? Options might be:
 - An EU advisory group entrusted with implementing competences (e.g. “RSPG enhanced”);
 - EU-level governance procedures financed by the Union budget (somewhat analogous to the BEREC office);

- Informal EU-level cooperation among national Spectrum Management Agencies
- d. What changes to the institutional set-up in relation to spectrum trading and leasing would you propose to provide greater regulatory predictability and legal certainty, and to promote the efficient usage of spectrum? Could these be the same mechanisms as those used for spectrum assignment procedures and usage conditions?
- e. Should there be regional assignment procedure (e.g. auctions) across multiple Member States (e.g. combining national licences) or pan-EU spectrum selection processes and/or usage rights?
- f. Should there be a common approach amongst Member States for documenting sharing conditions/rules and for granting shared spectrum access authorisations in the Digital Single Market?

4.2.3 Other issues

- a. What other changes are needed to provide a more effective and efficient governance regime for spectrum management in order to ensure an efficient usage of spectrum (e.g. licence exempt spectrum, shared access)?
- b. What other changes could you envisage to the institutional set-up?

5. Provisions on access to numbers and associated governance

5.1 Existing provisions

5.1.1 How do you rate the effectiveness and efficiency of current provisions in relation to numbers? Please distinguish among the following services:

- a. Publicly Available Telephone Service (PATS)
- b. Voice over IP (VoIP) services
- c. Machine-to-machine (M2M) communication services

5.1.2 Are national numbering plans a suitable way of administering numbers for Machine-to-machine (M2M) communications services, which often have a pan-European or global scale? Please distinguish between the following issues:

- a. Potential numbering scarcity with regard to national mobile network codes (MNCs)
- b. Extra-territorial use of E.164 numbers that is, use outside the borders of the assigning country
- c. Operator-lock-in effects, that is, difficulties for M2M and other providers to change SIM cards dissuading them from migrating to a new provider

5.2 Future provisions

5.2.1 What changes are needed to provide greater certainty and stability, avoid numbering shortages, and remove barriers to competition in the Digital Single Market?

5.2.2 What is the most relevant level for number range allocation:

- a. The current one?
- b. The national level, combined with extra-territorial use?
- c. the EU level?
- d. the global level?

5.2.3 What changes could you envisage to the current institutional set-up?

- a. Should there for instance be more EU-level guidance on number assignment procedures and conditions in the form of:
 - Commission recommendations under Article 19 of the Framework Directive (harmonisation)?
 - BEREC common positions?
- b. No change required or guidance needed?

6 Provisions on access to land and associated governance

6.1 Existing provisions

6.1.1 How do you rate the current provisions in relation to access to land (rights of way) and associated governance? Please address the following issues:

- a. Obligations and conditions for obtaining rights of way
- b. Time period between application and granting of rights of way
- c. Duration of rights of way
- d. Fees and charges for obtaining rights of way

6.2 Future provisions

6.2.1 What changes are needed to provide a more effective and efficient governance regime for rights of way to remove barriers to competition?

6.2.2 What changes could you envisage to the institutional set-up?

7 Evaluation of the provisions on market entry

7.1 Existing provisions

- 7.1.1 Does the absence of mutual recognition of national authorisations hinder the cross-border provision of electronic communications services and networks?
- 7.1.2 Are there currently any conditions attached to the general authorisation for the provision of electronic communications services and networks (as listed in the Annex A of the Authorisation Directive⁴⁵⁹ and/or specified at national level) which in your judgment:
- a. represent an unnecessary administrative burden?
 - b. hinder the cross-border provision of electronic communications services and networks?
 - c. are to be considered as vital for providers of electronic communications and end-users?

7.2 Future provisions

- 7.2.1 Should all providers of electronic communications services and networks (or any other type of provider as subjected to the future regulatory framework for electronic communications) benefit:
- a. from a general authorisation without any notification formalities?
 - b. from rights currently attached to the status of electronic communications providers (e.g. access to numbering resources for their own services, interoperability and interconnection)?
- 7.2.2 Should national notification requirements under the general authorisation regime be revised in order to clarify that authorisation cannot be denied to operators by virtue of their not being established in the country of provision of the service?
- 7.2.3 Should notification requirements be more fully standardised at EU level (for instance, by providing a standard form in one or more widely spoken languages that all Member States would be obliged to accept)?

⁴⁵⁹ Annex A specifies conditions that can be imposed in conjunction with an authorisation in general. The additional conditions that can be imposed when a authorisation also necessitates the use of frequencies or numbers are specified in Annexes B and C, respectively. Since spectrum and numbers are dealt with in earlier sections of this questionnaire, we do not ask again about them here.

7.2.4 Should Member States be permitted in the future to impose conditions in conjunction with the general authorisation beyond those foreseen by the current regulatory framework for electronic communications? If so, which one(s)?

5.3 Further data on switching

5.3.1 Ease of comparing offers

Further results on the ease of comparing offers can be gained from the EU Consumer Market Monitoring Survey which provides results for fixed telephony, mobile telephony and Internet access for the year 2013:

- In 16 out of 28 Member States, a majority of consumers say it is easy to compare fixed telephony services (Figure 72);
- In 17 Member States, a majority of consumers say it is easy to compare mobile telephony services (Figure 73); and
- In 16 Member States, a majority of consumers say it is easy to compare Internet access services (Figure 74).

Again, perceived comparability for fixed telephony, mobile telephony and internet access varies widely:

- In Denmark, Sweden, Croatia, Spain and Austria the perceived comparability is among the lowest.
- In Lithuania, Romania, Cyprus Luxembourg and Greece perceived comparability is among the highest.

Figure 72: Ease of comparing fixed telephony offers, 2013

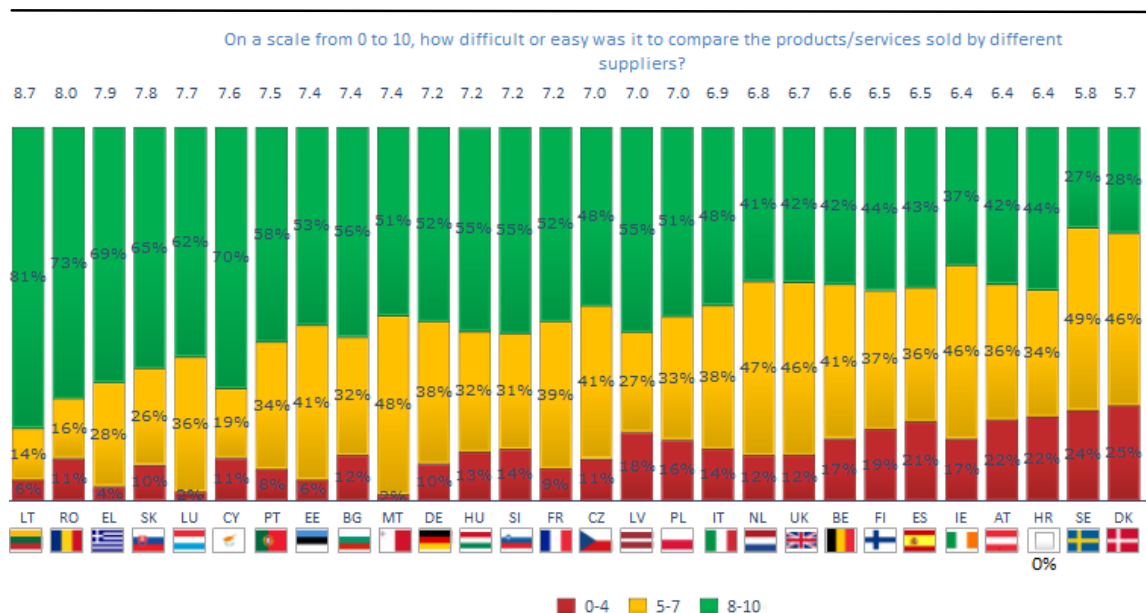
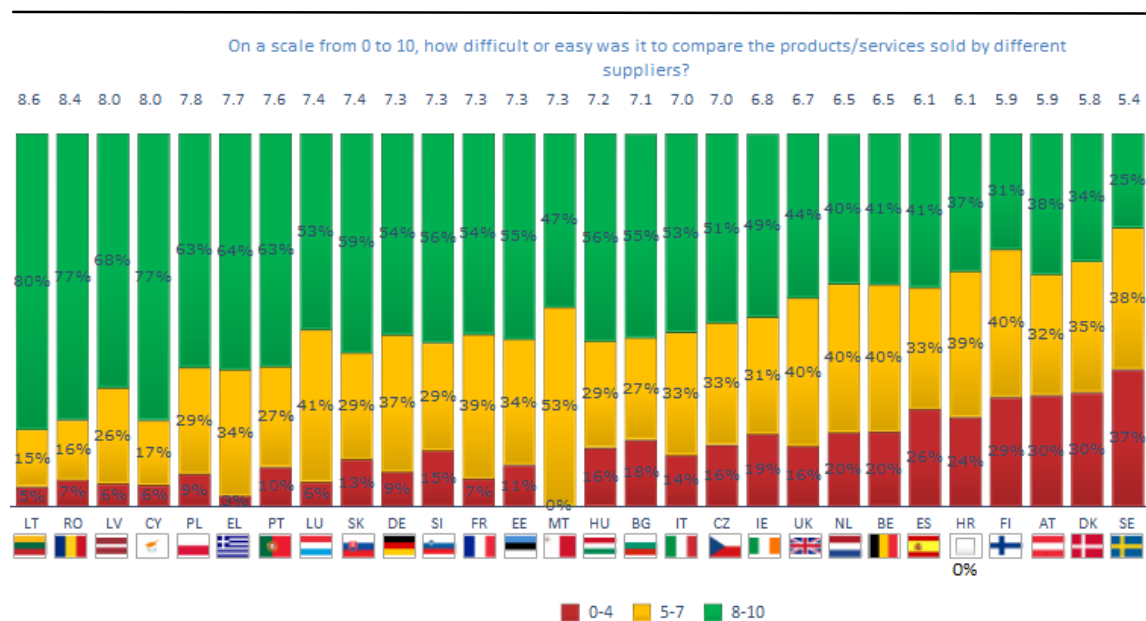
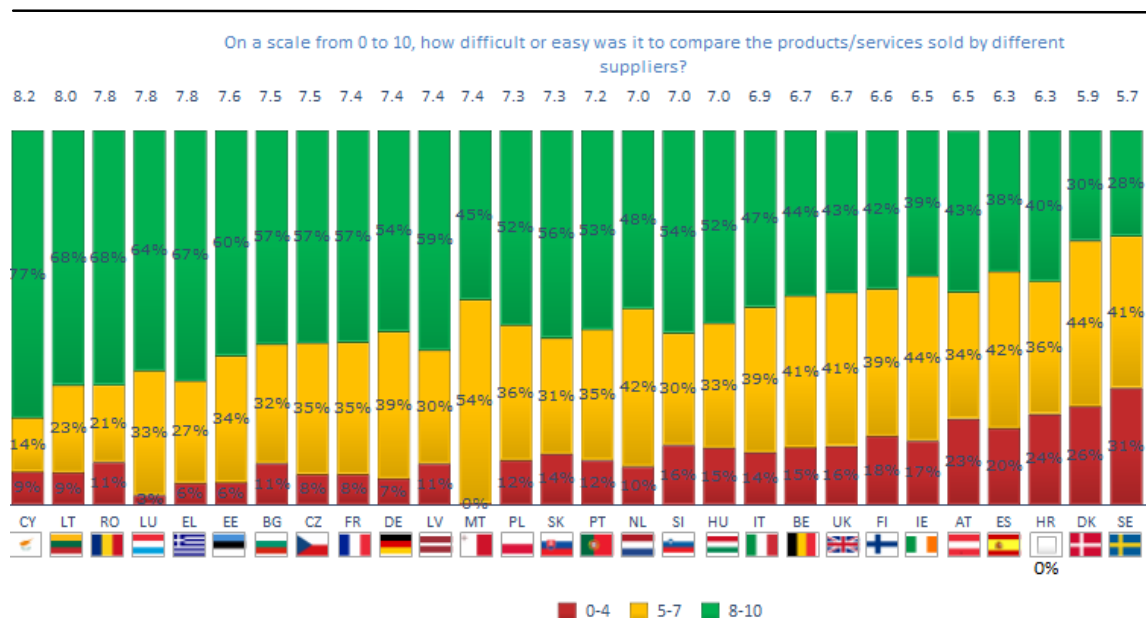


Figure 73: Ease of comparing mobile telephony offers, 2013



Source: European Commission (2013), EU Consumer Market Monitoring Survey (2013)

Figure 74: Ease of comparing Internet access offers, 2013



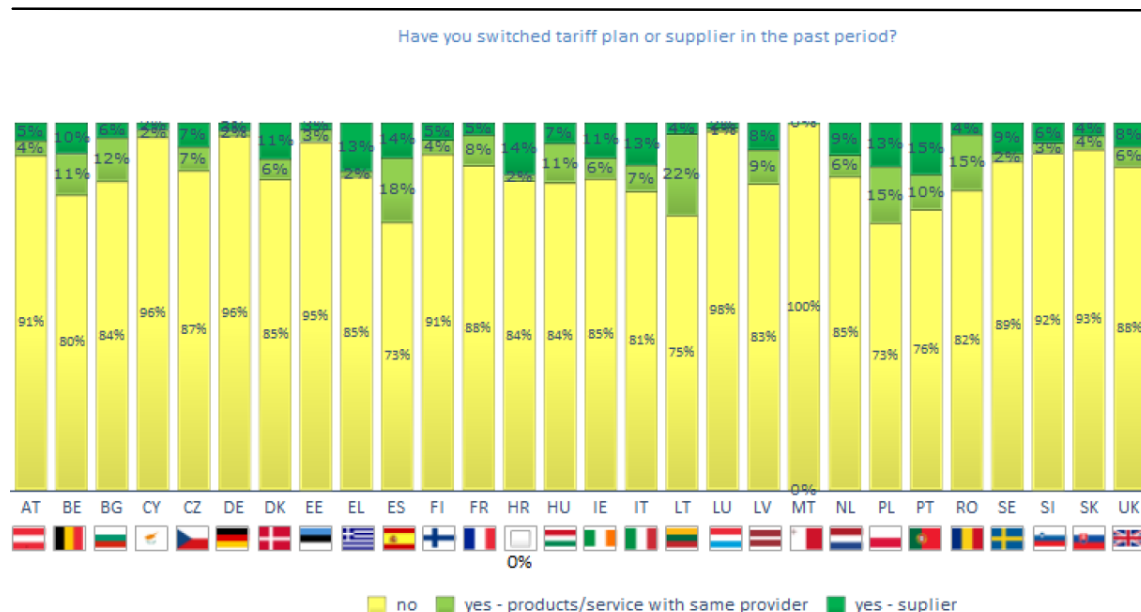
Source: European Commission (2013), EU Consumer Market Monitoring Survey (2013)

5.3.2 Switching of tariff plan or supplier

Data on switching rates for the last period gathered by the EU Consumer Market Monitoring Survey confirm the large variation between Member States. The percentages of consumers that switched tariff plan or supplier in the last period is shown in the following figures.

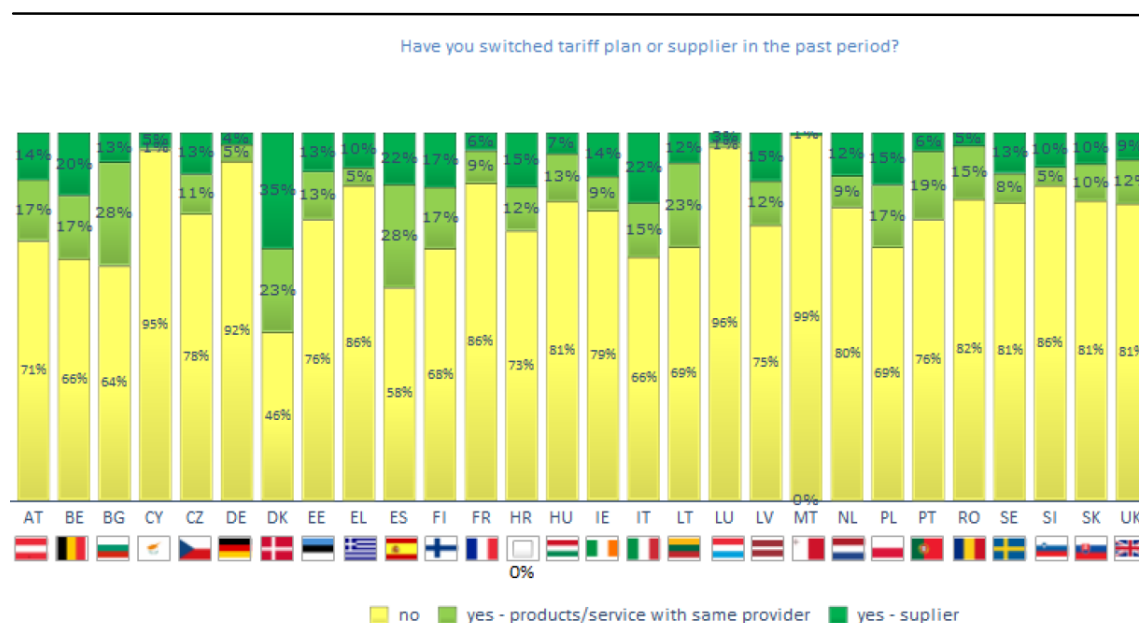
- In 12 out of 28 Member States, 5% or less of the consumers changed their supplier of fixed telephony in the last period (Figure 75).
- In 5 Member States, 5% or less of the consumers changed their supplier of mobile telephony in the last period (Figure 76).
- In 5 Member States, 5% or less of the consumers changed their supplier of internet access in the last period (Figure 77).

Figure 75 Percentage of consumers that have switched tariff plan or supplier of fixed telephony service in the past period, 2013



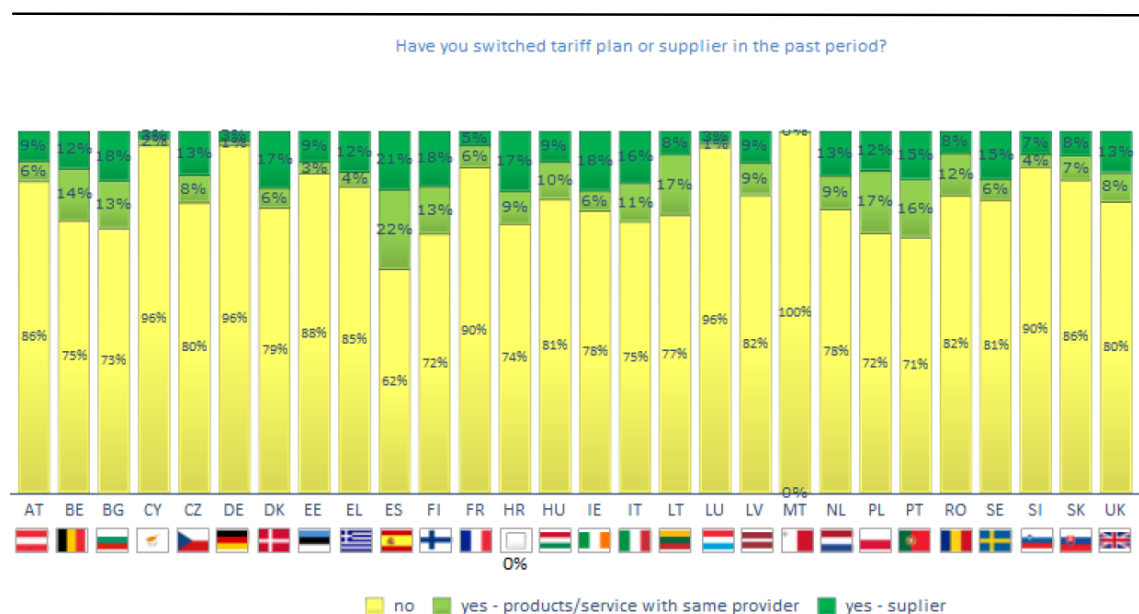
Source: European Commission (2013), EU Consumer Market Monitoring Survey (2013)

Figure 76: Percentage of consumers that have switched tariff plan or supplier of mobile telephony service in the past period, 2013



Source: European Commission (2013), EU Consumer Market Monitoring Survey (2013)

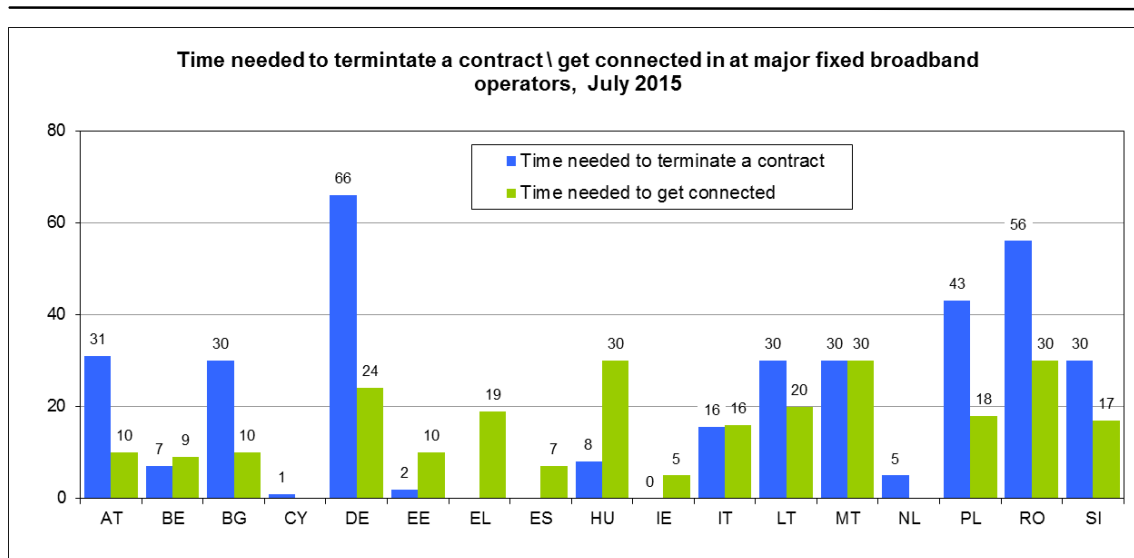
Figure 77: Percentage of consumers that have switched tariff plan or supplier of internet access service in the past period, 2013



Source: European Commission (2013), EU Consumer Market Monitoring Survey (2013)

5.3.3 Time need to terminate a contract / get connected for broadband

Figure 78: Time need to terminate a contract / get connected in at major fixed broadband operators, July 2015

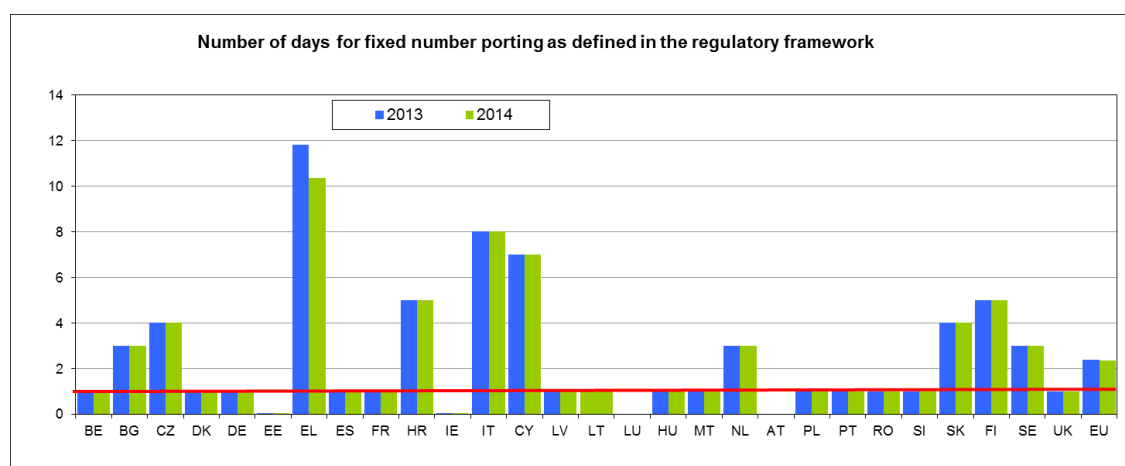


Source: European Commission (2015), DAE Financial Indicators 2015, Implementation Report 2015.

5.3.4 Number of days needed to port a fixed number

Figure 79 shows the number of days needed to port a fixed number. We found only a weak negative correlation between the % of installed fixed line subscribers who ported in 2014 and the maximum timeframe for the overall fixed porting process. The longer the overall porting process, the lower the actual number of ports expressed as % of the installed base.

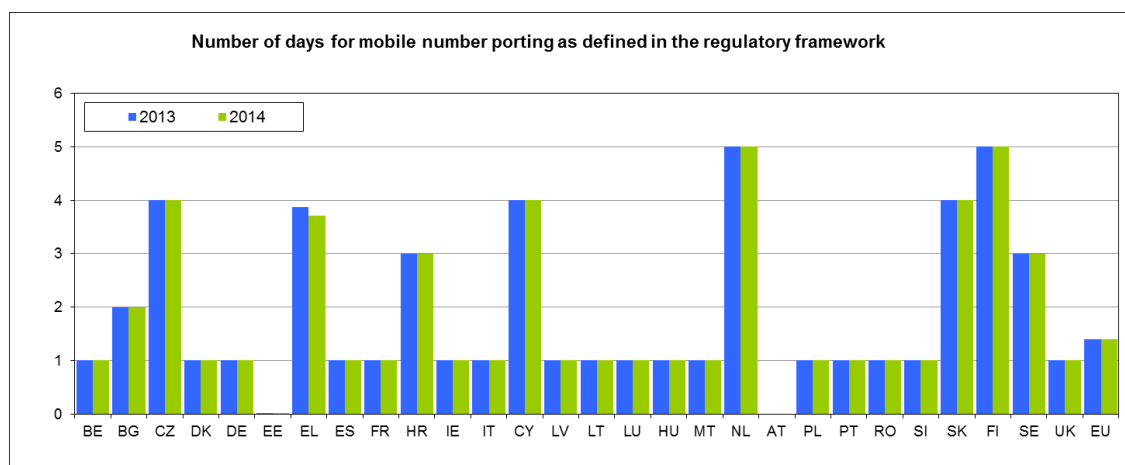
Figure 79: Number of days needed to port a fixed number, 2013-14



Source: European Commission (2015), DAE Financial Indicators 2015, Implementation Report 2015

Figure 80 shows the number of days needed to port a mobile number. We found a weak positive correlation between the % of the installed mobile base that has ported its number and the overall maximum time for porting.

Figure 80: Number of days needed to port a mobile number, 2013-14



Source: European Commission (2015), DAE Financial indicator 2015, Implementation Report 2015

5.4 Further data on 'must carry' obligations

Table 59: Platforms on which on which legislation of Member States allows the imposition of 'must carry' obligations as of February 2016

	Platforms on which 'must carry' obligations – in principle - may be imposed				Conditions for imposing 'must carry' obligations
	DTT	Cable	IPTV	Satellite	
AT		√			
BE *	√	√	√	√	All platforms widely used as a main platform of reception. In the German speaking Community of Belgium: only cable.
BG	√	√		√	
CY	NA	NA	NA	NA	
CZ		√			
DE		√	√		
DK	√	√	√		
EE	√	√	√		
GR	NA	NA	NA	NA	
ES		√			
FI	√	√	√		
FR		√	√	√	
HR ***	√	√	√	√	All platforms with significant market power
HU	√	√	√	√	All platforms widely used as main platform of reception
IE	√	√	√	√	Appropriate networks used by a significant number of end-users as principle means of receiving programmes
IT	√				
LT	√	√	√	√	All platforms
LU	NA	NA	NA	NA	
LV	√	√	√	√	All platforms
MA		√			
NL	√	√	√	√	All platforms

	Platforms on which 'must carry' obligations – in principle - may be imposed				Conditions for imposing 'must carry' obligations
	DTT	Cable	IPTV	Satellite	
PL		√	√	√	
PT	√	√	√	√	Appropriate networks used by a significant number of end-users as principle means of receiving programmes
RO		√			
SE		√	√		
SI	√	√	√	√	In Slovenia, must carry rules for DTT only apply to channels of special importance: local/regional, student and non-profit.
SK		√	√		
UK ***	√	√	√	√	Used by a significant number of end-users as principal means of receiving programmes (not imposed in practice)

Source: Based on Kevin and Schneeberger (2015), Access to TV platforms: must-carry rules, and access to free-DTT, European Audiovisual Observatory for the European Commission - DG COMM, December 2015, pp. 23-26
[http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+\(Dec.+2015\)/bb229779-3fb2-488d-9c0e-d91e7d94b24d](http://www.obs.coe.int/documents/205595/264629/Must+Carry+Report+(Dec.+2015)/bb229779-3fb2-488d-9c0e-d91e7d94b24d)

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